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RECOMMENDATIONS FOR DEVELOPING A SYSTEMATIC ANALYSIS OF THE MOUNTAINEERING ACTIVITY OF THE WORK OF AN INSTRUCTOR FOR THE TRAINING OF SPECIAL PURPOSE UNITS PERSONNEL FOR MOUNTAINOUS AREAS OPERATIONS

The article considers recommendations for the development of a systemic analysis of mountaineering activity in the work of an instructor for training personnel for operations in mountainous terrain. Such an analysis will assist in evaluating the actions of personnel of special-purpose units of the National Guard of Ukraine in mountainous areas. It is noted that the proposed recommendations make it possible to uniformly and systematically analyze the work of an instructor, which will ensure better training of special purpose units when performing tasks in special mountain conditions.

Keywords: *systems analysis, emergency situation, mountaineering, mountainous terrain, emergency incident, instructor, mountaineering training, ascent.*

Statement of the problem. Special purpose units of the National Guard of Ukraine perform specific service and combat tasks under special conditions, including mountainous terrain [1]. These tasks require the ability to correctly and safely overcome mountain obstacles, using knowledge and skills acquired during mountaineering (high-altitude) training, including appropriate movement and belay techniques in the mountains [15].

According to the Military Security and Defense Strategy of Ukraine [2], after the creation of conditions for the liberation of the Crimean Peninsula, the issue of conducting combat operations in mountainous and forested areas will arise. However, combat operations in the mountains have their own characteristics and require, first of all, high activity, maneuverability and mobility of units, their endurance, and the ability to overcome mountain obstacles.

To fulfill the outlined conditions, it is necessary to carefully prepare and train personnel, however, the training of climbers cannot be limited by only training in the technique of moving in the mountains. For the success of performing tasks in the mountains, it is no less important to know the nature of the mountains well, to be able to determine the features of the selected route, to calculate the time required to overcome it, to select the necessary equipment, etc. In view of this, mastering mountaineering (high-altitude) training is one of the decisive values.

At the present stage, a large number of methods of work of the instructor for training of personnel of special purpose units for actions in mountainous terrain are used in the practice of mountaineering. Recommendations for their application are given in the work [3]. Therefore, based on the application of the training methodology, there is a need to develop a systematic analysis of the mountaineering activity of the instructor for training personnel of special purpose units for actions in mountainous terrain. It is important that it be expedient and rational, and most importantly, it gives a good result for the highest quality assimilation of the educational material by those who study.

According to the functions defined by Law [1], servicemen of certain special purpose units may be involved in the performance of combat missions. Therefore, the systematic analysis of mountaineering activity should be uniform for all instructors in training personnel of special purpose units for operations in mountainous terrain. In view of the above, it is necessary to develop recommendations for the application of the systematic analysis of mountaineering activity in mountaineering for the purpose of uniform training for the performance of tasks in the mountains by

servicemen of special purpose units of the National Guard of Ukraine.

Analysis of recent research and publications. The problem of applying the system analysis of mountaineering activity in mountaineering is quite fully covered in the works of O. O. Repko [4, 5], D. Alen-Collinson [6], in the scientific and methodological and information materials of I. A. Martynov [7]. With the rapid development of mountaineering throughout the world (mostly due to modern equipment), many new methods of movement and belaying techniques appear in the mountains, which requires the improvement of the system analysis of mountaineering activity. In their works, the authors grouped and placed in a certain system various types of analysis of the instructor's mountaineering activity, but did not finally solve the problem, because each relied on his own practical experience.

The most well-founded consideration of this problem is given in the works of S. Rausch [8] and the outstanding German mountaineer G. Huber [9]. Scientists proposed a comprehensive program for generalizing the existing types of analysis of the instructor's mountaineering activities, however, the issue of systematizing unified approaches not fully disclosed. The issues of generalizing the existing types of analysis of the instructor's mountaineering activity during preparation for actions in mountainous terrain have been comprehensively studied in sources [10–15], but also without proper systematization of unified approaches.

Therefore, there is a need to generalize and systematize unified approaches. to Systematic analysis of mountaineering activities, the work of an instructor in training personnel of special forces units for operations in mountainous terrain.

The purpose of the article is to develop recommendations for a uniform understanding of common approaches to Systematic analysis of mountaineering activities of an instructor in training personnel of special purpose units for operations in the mountains.

Summary of the main material. Training in practical actions in the mountains and the direct performance of service and combat tasks takes place in the complex and changing conditions of nature, relief and climate of the mountains. It is obvious that if we consider the complex system "man – mountains", then among its main components there must be a subsystem of ensuring security, which compensates for risks.

An experienced climber must be able to analyze both the entire system as a whole and its components, and if necessary, individual aspects of climbing activities. Such analysis is the feedback that allows you to assess the optimality of the organization of work and the behavior of the climber from a safety perspective, the correctness of the decisions made by him, adjust these decisions for future actions in the mountains, and accumulate positive experience.

In addition, using systematic analysis, it is possible to develop models of activity in advance, which are then tested in practice and adjusted during the ascent process. In fact, this is the preparation of tactical plans or the solution of situational tasks.

Today, two types of analysis of mountain incidents are most commonly used :

1) descriptive analysis of accidents aimed at identifying the "culprits" (conducted annually by the Mountaineering Federation of Ukraine);

2) statistical analyses that investigate the dependence of the number of accidents on the qualification of climbers, the complexity of routes and terrain, the nature of violations, etc.

The main disadvantages of these types of analysis are the low reliability of the original data, the inability to reflect the cause-and-effect relationship, and insufficient systematicity.

Another approach is proposed by I. A. Martynov and A. I. Martynov [7]. They analyze the actions of a climber, establishing causal relationships between the occurrence of a dangerous situation and its development into an emergency, noting characteristic sequences and dependencies.

By systematizing the analysis of emergency situations (ES), it is possible to identify their main cause – errors or violations, which can lead to a wide variety of events. Errors in the actions of a climber are probably inevitable, so the main task is to predict possible errors and prevent them. There are not so many typical errors in mountaineering, and unlike ES, they are easier to classify and systematize. Incidents can be distinguished by their consequences, which are recorded in statistical generalizations. Accordingly, events are divided into the following types:

a) sports injury (SI) – a person receives a minor injury that causes short-term loss of ability to work, but does not threaten their general health;

b) emergency incident (EI) – a person or group finds themselves in a situation that may have life-

threatening consequences, but thanks to their own actions or a lucky coincidence, they emerge from it without serious injury;

c) accident – a person or group suffers significant injuries or dies as a result of an event.

Sports injuries are most often associated with the climber's lack of personal caution, his assessment of the terrain and his own capabilities.

Emergency incidents and accidents are often the result of insufficient efforts in self-improvement and mistakes in educational and training-sports work. This can lead to technical, tactical and moral shortcomings, as well as insufficient physical training of climbers.

It is necessary to accurately research and record all cases, regardless of their consequences, since even the simplest of them can contain the prerequisites for the most serious accidents. Studying the above should be an important aspect of educational work, because it not only contributes to the training of independence, but also helps to analyze complex and emergency situations. It also contributes to the upbringing of a sense of duty, mutual responsibility and the formation of motivation for safe behavior in mountaineers.

1. System analysis algorithm

The following should be taken into account:

– the circumstances of the incident;

– immediate causes;

– the organization of the event and its preliminary preparation (where, how and by whom it was held);

– psychological and moral aspects.

The analysis of sports injuries can be carried out more simply by paying special attention to the organization of the training process, the characteristics of the ascent, and the personal qualities of the victim or perpetrator of the incident.

When analyzing emergencies and accidents, it is necessary to consider all types of training and determine how the technical training of the group is related to the upbringing of responsibility and a sense of duty. Mistakes and violations often arise due to the lack of these qualities, so it is worth establishing a line between causes and consequences.

A climber's mistake is his actions that do not meet the requirements of the situation for one reason or another. Violations are failure to comply with regulations, instructions or requirements, neglect of technical techniques, tactical rules, physical condition, insufficient responsibility and discipline, lack of mutual control.

As a rule, a violation or serious error is not the only "fatal" one; it completes a chain of previous violations that form a cause-and-effect relationship.

For systematic error analysis based on the application of the Ishikawa diagram [16] the authors of the article proposed a classification of errors that takes into account their nature and causal dependencies. On its basis, an algorithm was created (Figure 1), which streamlines the analysis of mountaineering activities and allows predicting possible errors at separete stages of ascent. This calculation makes it possible to work out methods for preventing typical errors at the preparation stage, and to take into account possible risks in tactical planning of climbing.

When using the algorithm, the nature of the error and the causal relationships that led to it are considered at each stage.

Error analysis is categorized depending on the complexity of the mountaineering activity. At the first and second levels, the human factor is decisive, where the causes of personal and group errors are established. At the third level, the quality of the process execution is considered, that is, the causes of temporary and precision errors. At the fourth level, four categories of errors are distinguished (I, II, III, IV), each of which has four most typical groups (1, 2, 3, 4). Therefore, the fourth level can be presented in the form of a matrix characterizing the event. Error groups are generalized in nature, and details (for example, details of the breakdown or route choice) are not important here. The main purpose of this list is not to establish the causes of the accident, but to determine trends in committing errors (based on repeated cases in statistical matrices). This makes it possible to make the necessary changes to the organization and program of educational and training work.

Level 5 identifies in detail the most common and dangerous situations and the reasons why they turn into emergencies. This makes it possible to adjust programs and teaching methods.

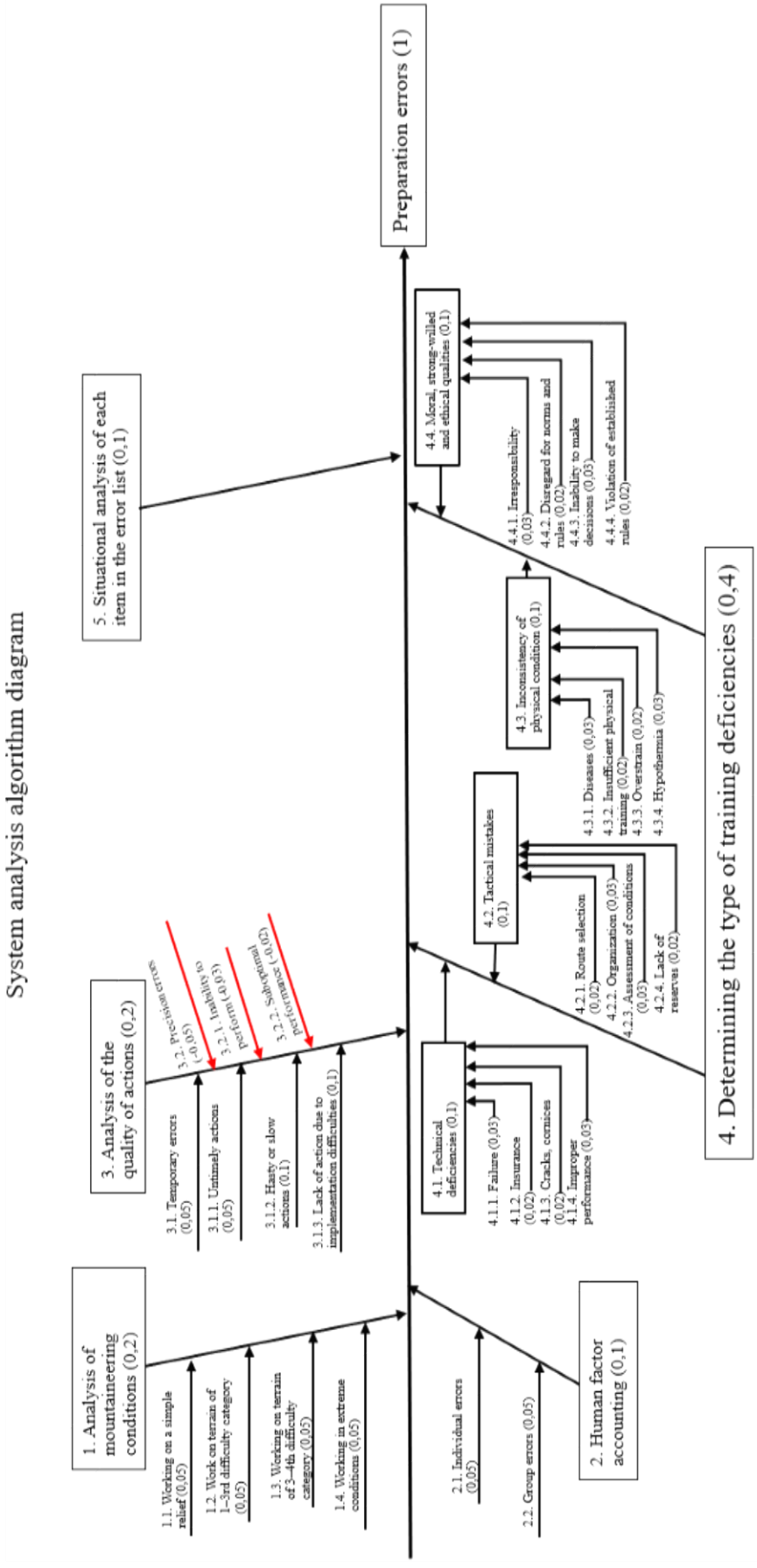

Figure 1 - Diagram of the system analysis algorithm

2. Purpose of action analysis

The modern "Climber Training Program" requires the ability to analyze one's activities, because without a comprehensive analysis it is impossible to correctly evaluate, adjust and predict climbing work. Depending on specific tasks, the following types of analysis can be distinguished:

– analysis of the entire system of mountaineering activities;

– analysis of the quality of climbers' training over several years or when summing up the results of the activities carried out;

– operational (situational) analysis during work;

– pedagogical analysis in the learning process.

These types of analysis differ in their purpose, as well as in the required level of information detail and the processing algorithm.

3. Analysis of the system of mountaineering activities

The analysis of the system of mountaineering activity serves to assess the degree of reliability of all subsystems and their categories, as well as to assess the organization of work in the training unit. It helps to predict trends in changes in reliability, which makes it possible to determine ways to improve work with climbers. Each event for a certain period is analyzed, for which the above algorithm is used. By examining each level of the algorithm, we identify errors and shortcomings that belong to separete categories of subsystems. Although in this context we do not consider the above in detail, it is worth noting that the list of factors outlined in the algorithm is a single system based on interrelated categories, without which it is impossible to carry out a systematic analysis of mountaineering activity. For example, in the process of analyzing several events at the events of one of the mountaineering clubs, it was found that on rock routes of I–III categories of complexity, there were EI and SI associated with the dropping of stones by a group in similar situations.

4. Analysis results

In the training unit, groups are formed from random personnel, which leads to a lack of coherence, mutual responsibility and sustained motivation to ensure safety. Instructors have little knowledge of the properties and qualities of each participant. Lack of information about the physical and psychological state of those who are training can lead to errors in training and organization of ascents.

Participants have insufficient skills to move on unstable rocks and do not always know how to choose the right route. This increases the risks and makes it more difficult to pass difficult sections, so thorough preparation is necessary.

5. Measures to improve the safety of mountaineering activities:

a) competent group formation (groups must organize themselves and establish interaction during classes and training);

b) constant work of instructors (instructors should study in detail the capabilities of participants, contribute to the formation of motivation and ethical norms, and also train them to the conscious implementation of rules and techniques);

c) practical and theoretical classes (training should be conducted on routes with difficult terrain, including unstable rocks; the program should be supplemented with theoretical classes on geomorphology for a deeper understanding of the terrain features);

d) control and organization by the commanders of the training unit (commanders must be directly responsible for educational work, ensuring high-quality training of personnel).

6. Analysis of the quality of climber training

Systematic analysis of the level of training is carried out at the level of the training unit. It is carried out by considering the accident rate and weaknesses of the training process for a certain period. The analysis can cover seasonal events (Alpiniads, training camps, training programs) and be the basis for adjusting training methods.

For effective assessment, it is sufficient to apply the fourth stage of the analysis algorithm. The number of elements of each type of error is determined. This data is used to identify systemic training flaws.

Therefore, detailed analysis helps improve the quality of the training process and minimize risks in the future.

6.1. Analysis of errors in the training of climbers

Error rates can indicate weaknesses in the learning process. It is important to interpret the data correctly to avoid false conclusions, for example:

– insufficient level of training of educational process leaders;

– deviation from training programs or their superficial implementation;

– shortcomings in educational work and psychological preparation of participants;

– organizational miscalculations or disregard for established rules.

6.2. Categories of errors in mountaineering activities

Error analysis allows us to divide them into several main categories:

1. Moral and psychological factors:

– lack of responsibility and violation of ethical standards;

– Insufficient motivation and mutual support in the group.

2. Technical training:

– errors in working with climbing equipment;

– insufficient skills for the technique of moving through difficult terrain.

3. Tactical training:

– incorrect route organization;

– tactical errors when choosing a route and distributing roles in the group.

4. Physical training:

– diseases or physical limitations that affect endurance;

– insufficient adaptation to weather conditions and altitude.

The main types of emergency situations are distinguished.

1. Disruptions:

– on rocks, ice, snow or trails;

– Incorrect route selection or insufficient securing of equipment.

2. Belay violation:

– non-compliance with self-belaying rules and an improperly organized belaying system.

3. Errors in assessing the situation:

– incorrect determination of the level of danger;

– demoralization of the group and disruption of coordination of actions.

4. Physical risks:

– hypothermia, exhaustion or exacerbation of chronic diseases;

– insufficient reserve of strength and endurance.

5. Failures on the ground:

– falling into cracks, falling from eaves;

– insufficient attention to the terrain and condition of the route.

Analysis of the activities of this educational unit allows us to draw the following conclusions:

a) in the training of climbers, gaps are systematically allowed in the development of movement and belay techniques;

b) insufficiently developed skills in organizing group actions and securing the route;

c) lack of clear ideas about the physical capabilities of the body, which leads to overexertion;

d) critical problem – insufficient motivation for safety and mutual responsibility in the group.

Research show that in many cases, an accident could have been avoided if someone in the group had warned their friend in time: "*Stop! Don't do that!* "

Given the repetition of errors and the significant number of instructors in the training unit, it is necessary to improve the quality of educational work, namely:

– enhanced control of the educational process;

– continuous improvement of instructors' qualifications;

– more stringent personnel selection to guarantee a high level of competence of the instructor staff.

7. Operational (situational) analysis

Operational analysis is based on a direct assessment of the climber's current actions and the surrounding situation. It serves to select the optimal solution in extreme conditions.

Using the classification of levels of thinking, it is possible to determine the hierarchical structure of operational analysis using the example of a group that found itself in an avalanche danger zone.

Decision-making process

The choice of the correct solution is carried out in the following sequence:

1) knowledge;

2) understanding the nature of avalanches.

Familiarization with the rules of conduct in an avalanche danger zone

1. Understanding:

a) awareness of why, when and how danger arises;

b) knowledge of what not to do in a critical situation.

2. Application:

a) use of technical and tactical techniques to overcome a dangerous area.

3. Analysis:

a) assessment of the various elements of the situation and their interrelationships;

b) if, for example, the movement is in the area with dense snow, with side slopes nearby, on which cornices are visible, then it is important:

– characterize each element;

– analyze potential risks.

4. Synthesis:

a) combining the analyzed factors into an interconnected system;

b) determination of route options, as well as possible incident scenarios:

– if one thing happens – we act like this;

– if the situation changes, we adjust our actions.

5. Evaluation:

a) final selection of the best option for overcoming or avoiding avalanche danger;

b) making a decision taking into account:

– data obtained during synthesis;

– external conditions and their possible changes.

Mastering situational analysis

Climbers, as a rule, confidently use the first three levels of the hierarchical structure of thinking:

1) knowledge;

2) skill;

3) application.

However, the following levels – analysis, synthesis and evaluation – often require additional development and deeper understanding.

Situational analysis methodology

To use situational analysis, it is necessary to analyze the 5th stage of the algorithm in detail. It is important to model possible errors for their practical processing. Situational analysis should be carried out not only theoretically (in the classroom, on paper), but also practically (on real terrain).

When modeling the future ascent and developing a tactical route plan, it is necessary to:

a) identify potential errors at each stage of the route;

b) analyze their nature and causality;

c) identify the dependence of errors on the situation.

This approach not only increases alertness on the route, but also makes it possible to:

– practice in advance ways to prevent errors;

– develop algorithms for adjusting actions to avoid the development of critical situations.

Therefore, systems analysis and practical modeling significantly increase the safety and effectiveness of mountaineering training.

8. Pedagogical analysis

Pedagogical analysis of the learning and education process is systemic by nature and is carried out:

1) an instructor who evaluates the results of his work or the activities of colleagues;

2) leaders of the climbing event, who analyze the effectiveness of the instructor's work.

Instructor performance analysis

Key aspects to be assessed:

– learning outcomes of each participant;

– what knowledge, skills and abilities did he acquire.

What was not mastered and the reasons for this:

– what measures need to be taken to adjust the level of qualification;

– what methods of improving moral and ethical norms influence his sports development;

– what can be recommended for further progress.

9. Analysis of pedagogical techniques:

1) evaluation of planned teaching methods;

2) what was implemented and what was not, and why;

3) whether the time limits for activities were respected;

4) what alternative methods should be used, taking into account the individual characteristics of the participants;

5) were the classes interesting and effective;

6) whether the communication methods between the instructor and the group were chosen correctly;

7) whether it was possible to establish feedback with the participants.

Analysis of educational work by the commander

In addition to the points mentioned above, the commander also evaluates:

– compliance of educational documentation with the actual content of the lesson;

– the connection of the curriculum with the approved programs and the level of training of the participants;

– using new or own teaching methods;

– the level of independence and initiative of the instructor;

– the instructor's authority among participants and its main factors;

– motivation methods used by the instructor;

– measures to ensure compliance with social and ethical norms during training.

This analysis helps to improve the quality of the educational process, ensure effective learning, and create a favorable atmosphere in the climbing group.

Conclusions

Therefore, there is a need for recommendations on the application of a systematic analysis of mountaineering activities in the work of an instructor for training personnel of special purpose units for operations in mountainous terrain.

The proposed recommendations make it possible to apply a unified systemic approach consistently to the analysis of mountaineering activities carried out by the instructor, which will ensure better training of special purpose units during training for performing tasks in the mountains.

A systematic approach for analyzing any actions of climbers by the instructor shows that solving problems in mountaineering cannot be limited by partial measures.

Learning, securing, and performing complex sports tasks are multi-component processes that require a systematic approach with constant feedback.

It is particularly important that systemic analysis and other types of assessment are not reduced merely to the search for those at fault, but serve as tools for identifying the causes of problems, developing methods for their elimination, and preventing them in the future. Such an approach makes it possible to increase the level of safety, improve the training process, and effectively develop mountaineering activities.

The direction of further research is to develop a rational approach to the physical training of special purpose units personnel for operations in mountainous terrain based on the recommendations provided.

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РЕКОМЕНДАЦІЇ ЩОДО РОЗРОБЛЕННЯ СИСТЕМНОГО АНАЛІЗУ АЛЬПІНІСТСЬКОЇ ДІЯЛЬНОСТІ РОБОТИ ІНСТРУКТОРА З ПІДГОТОВКИ ОСОБОВОГО СКЛАДУ ПІДРОЗДІЛІВ СПЕЦІАЛЬНОГО ПРИЗНАЧЕННЯ ДО ДІЙ У ГІРСЬКІЙ МІСЦЕВОСТІ

Розглянуто рекомендації щодо розроблення системного аналізу альпіністської діяльності роботи інструктора з підготовки особового складу до дій у горах, яка допомагатиме в оцінці дій особового складу підрозділів спеціального призначення Національної гвардії України в умовах гірської місцевості. Зазначено, що запропоновані рекомендації дають можливість одноманітно та системно аналізувати роботу інструктора, яка забезпечуватиме більш якісну підготовку підрозділів спеціального призначення під час виконання завдань в особливих умовах гір.

Бойові дії в горах мають свої особливості й потребують насамперед високої активності, маневреності та рухливості підрозділів, їхньої витривалості, вміння долати гірські перешкоди. Для виконання цих умов необхідно ретельно готувати та тренувати особовий склад, проте підготовка альпіністів не може обмежуватися тільки тренуванням з техніки пересування у горах. Для успіху виконання завдань у горах не менш важливо добре знати природу гір, уміти визначати особливості вибраного маршруту, розраховувати час, який потрібен для його подолання, підібрати необхідне спорядження тощо. З огляду на це, опанування альпіністської (висотної) підготовки має одне з вирішальних значень.

Згідно з визначеними у Законі України «Про Національну гвардію України» функціями до виконання бойових завдань можуть залучатися військовослужбовці визначених підрозділів спеціального призначення. Отже, системний аналіз альпіністської діяльності має бути єдиним для всіх інструкторів з підготовки особового складу підрозділів спеціального призначення до дій у гірській місцевості. Зважаючи на зазначене вище, необхідно розробити єдину структуру навчання, а також рекомендації щодо застосування системного аналізу альпіністської діяльності в альпінізмі з метою одноманітної підготовки до виконання завдань у горах військовослужбовцями підрозділів спеціального

призначення Національної гвардії України. Важливо, аби він був доцільним й раціональним, а головне – давав добрий результат для найякіснішого засвоєння навчального матеріалу тими, хто навчається.

Ключові слова: *системний аналіз, аварійна ситуація, альпінізм, гірська місцевість, надзвичайна подія, інструктор, альпіністська підготовка, сходження.*

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