Resume

MILITARY TECHNICAL POLICY

Chepkov I. B., *Doctor of Technical Sciences, Professor,*
Zubariev V. V., *Doctor of Technical Sciences, Professor,*
(Central Research Institute of Armaments and Military Equipment of the Armed Forces of Ukraine, Kyiv),
Sverhunov O. O., *Ph. D. in Engineering Science, Ass. Professor*
(National Institute of Strategic Researches, Kyiv)

SYSTEMATIC APPROACH TO THE ASSESSMENT OF MILITARY AND TECHNICAL ASPECTS OF ENSURING MILITARY SECURITY STATE IN THE CONTEXT OF GLOBAL POLITICAL AND RESOURCES CHANGES

The systematic analysis of various factors influencing the effectiveness of military-technical policy that arose in recent years in the context of new global political, economic, technological and resource changes has been carried out, and a methodological approach has been formulated to assess the impact of such factors on the effectiveness of military-technical policy.

Keywords: military-technical policy, system analysis, armament, military and special equipment, armament system, national security and defense.

Chepkov I. B., *Doctor of Technical Sciences, Professor,*
Demchenko Ye. Ya., *Head of the Research Department,*
Moskvitin O. O., *Ph. D. in Engineering Science, Leading Research Fellow,*
(Central Research Institute of Armaments and Military Equipment of the Armed Forces of Ukraine, Kyiv)

PROGRAM-TARGET METHOD OF PLANNING. APPLICATION OF PROGRAM-TARGET METHOD IN THE SYSTEM OF US DEFENSE PLANNING

In the article were considered issues of the PPBE process as the primary Resource Allocation Process (RAP) of DoD. It is an annual cyclical process to determine Department funding requirements and to allocate resources to satisfy those requirements. It is one of three major decision support systems for defense acquisition along with Joint Capabilities Integration and Development System (JCIDS) and the Defense Acquisition System.

It is a formal, systematic structure for making decisions on policy, strategy, and the development of forces and capabilities to accomplish anticipated missions. PPBE is currently an annual process, which requires the Military Departments and Defense Agencies to submit a program request (known as the Program Objectives Memorandum (POM)) covering a five fiscal year period and a budget request (known as the Budget Estimate Submission (BES)) that addresses the first fiscal year of the five year POM submission.

The article also contains the review of the primary purpose of the PPBE process - to allocate resources within the Department of Defense. Within the acquisition community, it is important for program managers and their staffs to be aware of the nature and timing of each of the events in the PPBE process, since they may be called upon to provide critical information that could be important to program funding and success. While the acquisition process is "event driven", the PPBE process is "calendar driven"; this difference can result in timing issues for the acquisition community.

On the results of conducted analysis, authors draw conclusion about the PPBE process as the instrument to establish policies, strategy, and prioritized goals for the Department of Defense. In the PPBE process, the Secretary of Defense establishes policies, strategy, and prioritized goals for the Department, which is subsequently used to guide resource allocation decisions that balance the guidance with fiscal constraints.

ARMORED VEHICLES

Bisyk S. P., *Ph. D. in Engineering Science, Senior Research Fellow*
(Central Research Institute of Armaments and Military Equipment of the Armed Forces of Ukraine, Kyiv)

THE ANALYSES OF RUSSIA FEDERATION ANTITANK MINES WITH USE METHODS OF CLUSTER ANALYSES

To date, the level of mite defense of armored vehicles is defined in STANAG 4569, which is based on the analysis of anti-tank mines from different countries of the world. However, in conditions of aggression of the Russian Federation, the issue of analyzing the antitank mines of this country and the subsequent formation of requirements for the mint defense of domestic armored vehicles is relevant.

The paper presents the results of the cluster analysis of Russia Federation antitank mines. Such studies are necessary for the formation of levels of mite defense of armored vehicles, which in turn is a prerequisite for conducting research on the resistance of the specimens.

Due to the large nomenclature of existing samples of anti-tank mines, they were grouped according to their functional purpose and basic technical characteristics for further formation of requirements for mint defense of combat armored vehicles. The most significant characteristic in the formation of anti-tank mines in the group was the mass of explosives. Such a generalization revealed the structure of a set of samples of anti-tank mines.

Taking into account and not that anti-tank mines can be fitted with different explosives, their mass is brought to the TNT equivalent.

Distributed anti-tank mines to groups (number of groups: six, five, four and three). Depending on the selected number of groups, the mass of the explosive in the group changes. In the opinion of the author, it is expedient to carry out the distribution by the maximum value of the mass of the explosive in the group. The most rational is the distribution of anti-tank mines into five groups. Obtaining the values of the mass of the explosive in the group shows that along with the requirements of STANAG 4569 the stability of armored combat vehicles to subvert charges of explosive 6 kg and 8 kg determined another level - 12 kg.

Formed groups (clusters) of anti-tank mines of the Russian Federation can be used in developing requirements for mint defense of domestic armored combat vehicles.

Keywords: antitank mines, cluster analyses, antimine protection.

ARTILLERY WEAPONS & SMALL ARMS

Senatorov V. M., *PhD in Engineering Sciences, Ass. Professor,*
Melnik O. D., *Leading Research Fellow,*
Efimenko V. A., *Senior Research Fellow*
(Central Research Institute of Armaments and Military Equipment of the Armed Forces of Ukraine, Kyiv)

COLLIMATOR SIGHT FOR CONCEALED PERFORMANCE OF BATTLE MISSION

That paper purpose is development of reliable collimator sight which would be able to carry out concealable a battle task in structure of small arms.

Sight must have a relevant structure for ensuring of the simplicity operation and reliability requirements. The mono-block optical schemes are satisfying there requirements: here a thick plane-convex lens is using for collimation of "red dot" type sight reticle image. Reticle pattern is combined with that plane lens surface. Reticle is illuminated by natural light. The additional information mark in form of circle encircling sight reticle is indicating for rifleman with purpose to reduce time for detecting of sight reticle in his viewing field. In sighting process a rifleman sees the collimated image of sight reticle by the first eye and watches a target by the second eye. Combining of both images takes place in human brain (binocular effect).

Tests of such sight "SAL-1" in structure of small arms "Gnome" (developer – Construction Bureau of Special Techniques) proved its high reliability.

Sight must have an optical scheme, where viewing line becomes warped under angle 90° relatively to weapon axis and rifleman has possibility to watch the reflected target image, for ensuring of concealed performance of battle task. Rhombic scheme from two parallel mirrors installed on exit of mono-block is satisfying to these requirements. Structurally, the first mirror is semi-transparent with purpose to combine the sight reticle image and targets space. At viewing by alone eye a fireman behind protective structure watches simultaneously a sight reticle and target which image is reflected by semitransparent mirror.

Proposed optical scheme, where sight reticle is linked firmly to optical axis, requires the specific approaches to sight designing and it installation on weapon.

Such way, sight wholly meets to modern trends for weapons and military equipment development deal with reliability and concealed execution of battle task with using of small arms.

Keywords: collimator sight, concealed mission, reliability.

Maystrenko O. V., *Ph.D. in Military Science, Professor*
(Hetman Petro Sahaidachnyi National Army Academy, Lviv),
Davidovskyi L. S., *Ph.D. in Engineering Science*
(Central Research Institute of Armaments and Military Equipment of the Armed Forces of Ukraine, Kyiv),
Prokopenko V. V., *Ph.D., Senior Lecturer,*
Bubenshchykov R. V., *Lecturer,*
Stegura S. I., *Senior Lecturer,*
(Hetman Petro Sahaidachnyi National Army Academy, Lviv)

METHOD OF BALANCING FORCES AND MEANS OF SUBSYSTEMS OF FIRE DAMAGE OF THE ENEMY

Recent military conflicts, including the Anti-Terrorist Operation in the East of Ukraine (ATO), revealed a number of trends that significantly affect the result of the military use of military formations (WF), including missile forces and artillery (RVIA). These tendencies include: a significant reduction in the time of the detection-defeat cycle, an increase in the proportion of unscheduled tasks related to the enemy's fire damage (VUP), the speed of combat collisions, and the increased proportion of so-called non-classical methods of using the WF, such as guerrilla, raid, sabotage and reconnaissance. The indicated tendencies necessitate revision of methodical approaches to the organization of combat application of the WF in general and the WUP in particular.

Given the existing analytical materials, it may be argued that, at least an approximate coincidence of the expected outcome of the VUU with the real, according to the most optimistic results of the analysis, in 50% of cases. This is unacceptable in the further development of the above-mentioned tendencies.

To adequately balance the capabilities of the VU subsystems, it is necessary to determine the indicators of these capabilities that will be spatial for all subsystems of the VUU. To this end, it is proposed to use a new set of indicators, which characterizes a certain dynamic work with the object for defeat, in particular - the intensity of detection of enemy objects, the intensity of the decision to defeat enemy objects, the intensity of damage to enemy objects.

Therefore, in order to balance the forces and means of the subsystems of the VUU, it is necessary to determine the capabilities of each of the subsystems for the "processing" of objects for defeat. In the future, determining the subsystem with the least ability to determine how much capacity is in the "surplus" in other subsystems. After that, either withdraw part of the forces and resources of those subsystems whose capabilities were in surplus, reserve or replenish forces and means (if any) of the subsystem where there was insufficient capacity.

Keywords: rocket troops and artillery, fire damage, balance of forces and means, a separate functional element.

PERSONAL EQUIPMENT

Golub V. A., *Doctor of Technical Sciences, Professor, Head of Research Department,*
Zuravsky S. V., *Senior Research Fellow of the Research Department*
(Central Research Institute of Armaments and Military Equipment of the Armed Forces of Ukraine, Kyiv)

METHOD OF DETERMINING THE DEPENDENCE OF THE MAXIMUM LEVEL OF EFFICIENCY OF ARMOR REGARDING ITS AREA

The article analyzes the statistics of military personnel injuries that took part in combat operations in the territory of Luhansk and Donetsk oblasts with indication of parts of the body. On the basis of the analysis of personal injury statistics, the theoretical dependence of the maximum level of protection of the body armor on its area was obtained. The determination of the effectiveness of the body armor used by the servicemen of the Armed Forces of Ukraine in the area of the antiterrorist operation was carried out. The obtained dependence of the maximum level of protection of the body armor from its area can be used in the development of a methodology to substantiate the requirements for body armor.

Keywords: body armor, protection area, probability of injury, human body surface area, equipment, efficiency, statistics, injuries, forearm, element of protection, intensity of defeat.

RADIO-TECHNICAL FACILITIES

Bieliaiev D.M., *Research Fellow,*
Rasstryhin O.O., *Doctor of Technical Sciences, Senior Research Fellow, Principal Research Fellow,*
Kisiel P.I., *Ph.D. in Engineering Science, Senior Research Fellow, Leading Research Fellow,*
Semeniuk R.P., *Research Fellow*
(Central Research Institute of Armaments and Military Equipment of the Armed Forces of Ukraine, Kyiv)

TECHNICAL AND ECONOMIC ASSESSMENT OF THE EFFECTIVENESS OF A MOBILE BALLOON RADAR SYSTEM FOR DETECTING LOW-ALTITUDE TARGETS

The technical and economic assessment of the effectiveness of a mobile balloon radar system for detecting low-altitude targets is given. The calculations of the annual economic effect indicator for the operation of the proposed complex in comparison with the existing radio engineering equipment, which are in service with the Armed Forces of Ukraine6 are given.

AUTOMATED CONTROL SYSTEMS

Herasimov S. V., *Doctor of Engineering Science, Seniors Research Fellow,*
Roshchupkin E. S., *Ph.D. in Engineering Science, Seniors Research Fellow*
(Kharkiv National Air Force University Named After Ivan Kozhedub, Kharkiv)

THEORY TO CALCULATE OF ERRORS OF VALUES OF SIGNALS WITH HARMONICALLY CHANGING PARAMETERS

Correlation for statistical descriptions of estimations of values of signals of the parameters that change according to a harmonic law and results of their analysis are considered. On the basis of the obtained correlations, the chart of control device of highways is synthesized and principle of its work is described. Recommendations over practical application of the obtained results are presented.

Keywords: signal useful, influence mixing, parameter harmonically changing, descriptions statistical, control of parameters, feed-back.

COMMUNICATIONS MEANS

Nalapko O. L., *Advanced Student*
(Central Research Institute of Armaments and Military Equipment of the Armed Forces of Ukraine, Kyiv)

COMPARATIVE ANALYSIS OF FUNCTIONAL POSSIBILITIES OF AD HOC NETWORKS OF TELECOMMUNICATIONS

In the real article the analysis of functional possibilities of networks is conducted possible AD HOC. Determination of optimal type of network of military-oriented. Scientific editions and progress trend have an analysis of modern directions of research. Determination of actual and perspective direction is for the advanced study in further researches. Absence of the base station requires, that every knot was more intellectual, could function both network host for a transmission and receipt of data and router for routing of packages to other knots of addressees. Many constituents must be taken into account thus, such as: power of signal, chance of change at a topology and her adjustment, changeableness of amount of knots, principle of organization of information transfer, multichannel of networks, search of optimal routes and routing of packages to the recipient, priority of data that is passed, balancing of loading of communication of data, charge of battery of mobile knot, difference of calculable resources, change of diagram of orientation of aerial, providing assured delivery package, and others like that. The types of ad are analysed in this scientific research — Ad hoc networks and certainly, that for application in the networks of the special setting with high dynamic of change to the count of topology as a result of mobility of knots, that characteristically to application in networks military.

Keywords: Ad hoc Networks, radio networks, cellular networks, hybrid networks, Mesh, sensory networks, wireless network, pico-cell, multi-hop, touch-controls, base station, routing, network, host, knot multiaddress, traffic, decentralizing networks, MANET, WANET, MCN, QoS, special wireless networks, networks of military-oriented, hybrid architecture, communication of data, intellectual, mobile knots, real-time mode, communication network.

Ryzhov Y. V., *Ph.D. in Engineering Science*
(Hetman Petro Sahaidachnyi National Army Academy, Lviv),
Sakovych L. M., *Ph.D. in Engineering Science, Associate Professor*
(Institute of Special Communication and Information Security of National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Kyiv)

EVALUATION OF MEASURING INSTRUMENTS METROLOGICAL RELIABILITY INFLUENCE ON INDICATORS OF REPAIRS OF MILITARY COMMUNICATION MEANS

In the article the approach to the quantitative estimation of the influence of metrological reliability of means of measuring equipment on the time of performance of the verification of the parameters of military communications means during their maintenance and current repair is proposed. In known works, approximate values of the probability of failure-free operation of measuring instruments are used for this, which reduces the accuracy of the results obtained.

The obtained results should be used in the methods of justifying the minimum permissible value of the probability of evaluating the result of checking the parameters, which will allow us to estimate the time of performance of work more objectively and reasonably choose the means of measuring equipment with the minimum necessary metrological characteristics to reduce the cost of maintenance and current repair of military communication means.

PRODUCTION, MODERNIZATION, MAINTENANCE

Shyshanov M. O., *Doctor of Technical Sciences, Professor,*
Chechenkova O. L., *Senior Research Fellow,*
Pavlovskyi I. V., *Senior Research Fellow*
(Central Research Institute of Armaments and Military Equipment of the Armed Forces of Ukraine, Kyiv)

TECHNICAL AND ECONOMIC ASSESSMENT OF THE ARMORED VEHICLE MODERNIZATION IN THE COURSE OF OVERHAUL

The article deals with the issue of assessing the technical and economic efficiency of modernization of armored vehicles and armament in the course of overhaul. It has been proved that modernization contributes to the prolongation of the life cycle of reusable samples of weapons and military equipment but each construction of mentioned samples has limited adaptability to modernization from economic point of view.

Keywords: modernization, armored vehicles and armament, efficiency, technical and economic assessment

SURVIVABILITY

Osinovyy G. G., *Head of the Research Projects Department,*
Subach V. P., *Leading Design Engineer of the Complex*
(Yuzhnoye Design Office, Dnipro),
Bykov V. N., *Doctor of Technical Sciences, Senior Research Fellow, Professor,*
Kolchigin N. N., *Doctor of Physics and Mathematics, Professor, Head of Chair*
(V. N. Karazin Kharkiv National University, Kharkiv)

GROUND-BASED OBJECT RADAR DETECTION COUNTERMEASURES

The rapid development of reconnaissance equipment and high-precision weapons makes the matter of military equipment camouflage a high priority. On account of this, military developers attach great importance to the creation of state-of-the-art low detectable equipment. Meeting these low observability requirements ensures shorter range and probability of detection for developed military equipment, which contributes to its survivability and combat mission success.

The use of broadband camouflage nets shows promise for lowering decamouflage properties of an object in a broad wave band, since the nets can not only disguise the appearance of a protected object, but also reduce its reflection properties and object-to-background contrast. An effective technique for making a small ground vehicle on the move less detectable by radar and infrared reconnaissance equipment is the use of disguise screens containing electrically conducting filaments and radar-absorbing materials. Such a broadband disguise screen mounted statically on a protected object allows changing its appearance, reducing its reflection properties and radio brightness. Although passive absorbing and scattering coatings have the maximum effect for stationary objects, they ensure a several times shorter detectability range for a disguised object on the move which can be easily detected by a radar system operating in a moving target selection mode. For concealing small ground vehicles on the move, Yuzhnoye State Design Office is working on production of special disguise screens from domestically manufactured materials. The absorbing properties of a screen base and a high-tech nap material ensure advanced characteristics of a camouflage system.

It follows from the analysis of methods and equipment for disguising small ground vehicles on the move in a radar range that the most appropriate technique is the use of a camouflage screen made of radar-absorbing and scattering materials. It allows meeting all the conflicting requirements for signature management equipment for small ground vehicles on the move through providing a broad band of electromagnetic waves to be used for disguising, easy operation, high durability, and long life of a camouflage system.

Keywords: camouflage, means of reducing visibility, small-sized mobile ground objects, radiometric passive-active detection systems, radioabsorption.

Osinovyy G. G., *Head of the Research Projects Department,*
Subach V. P., *Leading Design Engineer of the Complex*
(Yuzhnoye Design Office, Dnipro),
Bykov V. N., *Doctor of Technical Sciences, Senior Research Fellow, Professor,*
Kolchigin N. N., *Doctor of Physics and Mathematics, Professor, Head of Chair*
(V. N. Karazin Kharkiv National University, Kharkiv)

AIRCRAFT RADAR SIGNATURE REDUCTION THROUGH STEALTH TECHNOLOGY

The development of military equipment keeps step with the invention of technologies aiming for advanced survivability and mission accomplishment probability. Laser and infrared detection systems are usually used as auxiliary equipment and supplements for radar systems, which is why the matter of radar signature reduction deserves close attention. The radar cross section (RCS) is the key physical parameter defining the aircraft signature within a radar range of electromagnetic waves. The RCS depends greatly on the aircraft's outer surface regularity and coating materials. The application of radar-absorbing high-temperature composite materials shows promise for passive lowering decamouflage properties of an object in a radar range. The development of a coating with a stable reflection coefficient of not less than minus 20 dB in the range of 1 to 12 GHz requires the following:

Significantly increased coating thickness due to a larger amount of matched layers. It is possible to obtain a more broadband radar-absorbing material: d = (0.1-0.15)lmax, where lmax is the maximum band wavelength. Since the maximum wavelength of the L-band is 30 cm, the material thickness ensuring the most part of energy absorbed is lmax = 30-45 mm

Search for magnetic admixtures which are resistant to thermal effects and have stable long-storage magnetic properties.

The following should be taken into account in developing a high-tech aircraft radar signature reduction material:

Introduction of ferrite admixtures results in somewhat increased thickness and surface density of a material, and requires Curie temperatures to be taken into account. Ferrites heated up to above the Curie temperature lose their magnetic properties badly and rapidly, thereby damaging the materials irreversibly

Ferrite materials can lose their magnetic properties due to long storage, even at constant temperature and zero intensity of magnetization. The properties of a ferrimagnetic item start degrading as soon as it is produced. A material's magnetic permeability can vary in time without any external factor affecting (desaccomodation process)

Mechanical actions can affect the parameters of ferrites; for instance, the original magnetic permeability can irreversibly fall due to intense vibration or shocks.

It was experimentally proven for coating samples that the application of a high-temperature radar-absorbent gradient coating ensures a greatly decreased radar cross section and enhanced combat efficiency, especially in the case when both radar jamming and detection equipment is used simultaneously.

Keywords: aircraft, radioabsorbtion, Stealth-technology, anti-radar coverage, composite radio-absorbing structures.

UNCONVENTIONAL WEAPONS

Fedorov P. M., *PhD, Senior Researcher,*
Bohucharskyi V. V., *PhD, Senior Researcher,*
Hamaliy N. V., *Senior Researcher*
(Central Research Institute of Armaments and Military Equipment of the Armed Forces of Ukraine, Kyiv)

CALCULATION OF THE ELECTROMAGNETIC PULSE WEAPON EFFECTIVE AREA

A method for calculating the range of action and the effective area of electromagnetic pulse weapon based on a simplified deterministic approach has been developed. The level of guaranteed functional kill of radio electronic means that are not equipped with protection systems against electromagnetic pulse

has been substantiated. The relationships between the so-called ER parameter and the range of action of the electromagnetic pulse weapon in the direction of pattern peak of its antenna system have been shown, formulas for calculating of mentioned parameter have been proposed. It is found that for the hitting of radio electronic means on the maximum area, it is necessary to choose correct electromagnetic pulse weapon range of action. Calculation ratios to determine such optimal range of action have been obtained. It is shown that the magnitude of the maximum hitting radius in a first approximation should be determined only by the power of the used generator and by the criteria level of the hitting of radio electronic means and practically it does not depend on the choice of electromagnetic pulse weapon antenna system.

Keywords: electromagnetic pulse weapon, performance data, radio electronic means, functional kill, range of action, effective area.

INTELLECTUAL PROPERTY

Komarov V. O., *Head of the Research Department,*
Yaremenko M. P., *Research Fellow,*
Moskvitin O. O., *Leading Research Fellow*
(Central Research Institute of Armaments and Military Equipment of the Armed Forces of Ukraine, Kyiv)

PROBLEM ISSUES OF LEGAL PROVISION OF THE PATENT LICENSED ACCOMPANIMENT OF DEVELOPMENT AND MODERNIZATION OF ARMAMENT AND MILITARY EQUIPMENT IN UKRAINE

In the article were considered issues of protection of the intellectual property that is created for budgetary funds. On the results of the conducted analysis were indicated certain objects that form the scientific and technical treasury of every state. However in the field of intellectual property of Ukraine there are some issues of legal character such as definition of the role and the place of the state in the sphere of intellectual property, which need research and rapid decision.

In the frames of uncertain definition of the state as the customer of the objects of the right of intellectual property the foreign consumers of objects that have corresponding sponsorship and possibility of unimpeded access to scientific and technological potential of Ukraine start to occupy a basic segment of the market of intellectual services in the state intellectual property rights.

Underestimation from the side of the state of economic indicators from introduction of effective mechanisms of possession and management rights on objects of right of intellectual property, created mostly due to funds of the state budget, bringing in of objects of this activity to civil turnover already today results in losses the state of high incomes.

In particular, it takes place in the defense-industrial complex that determines position of the state as a special exporter on the international market of armaments, provides considerable volumes of the currency income and proper level of defensive capacity of the Armed Forces of Ukraine.

The article contains an analysis on how legal norms in relation to a grant, use and defence of objects of right of intellectual property are well-regulated in internal legislation. It concerns especially intellectual property of special and double-used goods.

Authors, based on the results of conducted analysis, made the conclusion about the necessity of providing of complete control of the state on the right of intellectual property of the competitive subjects of manage in specific area of development and production of new standards of armament and military equipment, taking into account the modern level of their high technological capabilities.

The article also contains the review of the legal provision of the patent licensed accompaniment of developments and modernization of armament and military technique in Ukraine, and also analysis of the modern state of the system of legal safeguard of inventions and useful models in Ukraine (patent system).

The solution of the indicated in the article issues will give an opportunity to create conditions for providing the legal defense of interests of the state in the process of making use of the results of research and development works, special and double use goods, and mainly – to provide the defensive capacity of the state, competitiveness of the produced in Ukraine military equipment and will assist the use of objects of right of intellectual ownership in national interests of Ukraine.

ШАНОВНІ АВТОРИ!

Оскільки пріоритетним завданням науково-технічного журналу «Озброєння та військова техніка» є входження до двох найавторитетніших у світі реферативних баз даних Scopus та Web of Science, редакція вводить нові (додаткові) вимоги до оформлення статей.

Додаткові вимоги до списку літератури («References»)

Список літератури повинен включати мінімум 10 джерел. Із них не менше 3-х джерел мають бути іноземні (латиницею).

Не авторські джерела (закони, постанови, накази, інші офіційні джерела, неопубліковані документи тощо) можуть бути включені до списку, але не враховуються в названий мінімум.

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Додаткові вимоги до авторських резюме

Авторське резюме до статті є основним (часто самостійним і незалежним від основного тексту) джерелом інформації у міжнародних базах даних, в яких індексується журнал. З авторського резюме читач має чітко зрозуміти сутність дослідження й вирішити, чи варто звертатися до повного тексту статті для отримання детальної інформації.

Авторські резюме (англійською, українською та російською мовами) повинні:

Містити не менше 150, але не більше 300 слів.

Коротко повторювати структуру статті (цілі й завдання дослідження, методи, результати, висновки).

Не містити посилань на літературу та абревіатур (якщо це можливо).

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