

SECTION 3. FORENSIC EXAMINATION

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3.1 Directions and sources of solving current problems in the development of forensic expertise

The development of forensic expertise in Ukraine received the highest legal foundation 30 years ago, when the Law of Ukraine "On Forensic Expertise" was adopted. Over the years, there have been significant gains in the above-mentioned development, and certain problems have arisen that require to be resolved [13].

It is worth considering that one of the most urgent problems of the development of forensic expertise in modern Ukraine are those related to the formation and functioning of the national security system of our country [14].

In the modern legislation of Ukraine, the phrase "national security of Ukraine" is defined as the protection of state sovereignty, territorial integrity, democratic constitutional order and other national interests of Ukraine from real and potential threats [15].

It is obvious that a prominent place in the formation of Ukraine's national security in the conditions of an ongoing full-scale war is occupied by products for military use. An integral part of this production is equipment for the military, which has recently gone beyond the classical concepts of "uniform" etc., and is defined by the modern complex international concept of "tactical clothing" [16].

A general analysis of only the relevant market segment in Ukraine proves that the assortment of modern tactical clothing is very diverse, constantly expanding and updating. For example, only one young domestic manufacturer of tactical clothing - the company "M·TAC" - successfully manufactures several dozen groups of commercial products. In turn, these groups contain hundreds of types and varieties of products for the military: underwear, clothes, shoes, products for storing and transporting military property, equipment for military recreation or overnight stays in the field (backpacks, bags, covers, etc.), unloading systems, belts, gloves, scarves,

holsters, camouflage, headgear, lighting devices, protective gear, knee and elbow pads, tactical gear, weapon accessories and more [17].

It is obvious that the importance and the role of each of the mentioned products of tactical clothing and similar goods in the formation of the national security of Ukraine at the level of ensuring the protection, combat capability and general comfort of a particular soldier cannot be overestimated; even more so for such products as helmets, body armor, protective equipment, weapon accessories. This applies even more to products such as helmets, body armor, protective equipment and weapon accessories. Practically, this means that the available assortment and level of quality of tactical clothing directly affects the formation of the national security of Ukraine, as it has an exceptional impact on the protection of life, health, well-being and other parameters of the state of the defenders of the Motherland, which ultimately affect their combat capability and capacity to recovery.

On the other hand, unfortunately, during the war, the problem of the supply of low-quality products for military purposes became large and acutely relevant (for example, an unscrupulous entrepreneur supplied the Armed Forces of Ukraine with low-quality uniforms in the amount of more than €35 million [18]).

The above-mentioned and other similar facts allow us to assert that today, more than ever before, the problem of the most objective verification of the quality level of military products is becoming particularly acute.

Basic provisions on product quality at the level of goods of any purpose in Ukraine are standardized [19]. In particular, in relation to the problems that are investigated in this article, the State Standard clearly formulates the key concepts:

- product quality: a set of product characteristics (process, service) that relate to its ability to satisfy established and anticipated needs;
- product quality requirements: expression of certain needs by translating them into a set of quantitatively or qualitatively established norms regarding product characteristics to ensure the possibility of its verification when used as intended;

- consumer property of the product: a property that determines its usefulness and ability to satisfy the needs of consumers and is manifested in the process of consumption;

- consumer indicator of product quality: a quantitative characteristic of one or more consumer properties of the product, which is considered in accordance with the conditions of its consumption.

The main significance of these formulations lies in the obligation of their unambiguous interpretation by all subjects of product quality research, including military products.

The study of numerical values of indicators (characteristics) and the level of product quality is one of the most fundamental components of the system of special knowledge and one of the most responsible functions of forensic experts in expert specialty 12.1 "Determining the value of machines, equipment, raw materials and consumer goods" [20].

Such research is carried out by instrumental and organoleptic methods [19, 21].

The instrumental (laboratory) method of determining product quality indicators is carried out with the help of special devices, equipment, etc., which make it possible to unambiguously establish the numerical values of indicators (characteristics) and the level of product quality. Therefore, this method is considered the most objective.

In the modern practice of forensic expert activity, laboratory methods of research are exclusively the only or basic ones in the activity of specialists of almost all expert specialties. Therefore, in recent years, the Lviv Scientific Research Forensic Center of the Ministry of Internal Affairs of Ukraine has paid considerable attention to the theoretical justification of the use of laboratory research methods in the activities of forensic experts of expert specialty 12.1 [22, 23].

This justification is based on the example of footwear products, which, on the one hand, are a long-term object of research by individual authors [24], and on the other hand, are an integral part of tactical clothing [16, 17].

The above convincingly proves and allows us to unequivocally affirm the existence of an extremely urgent need and the possibility of using the special

knowledge of forensic experts of expert specialty 12.1 to create a separate direction of the formation of the state security of Ukraine through the use of special knowledge - laboratory methods of research of the general level of the quality of a specific product of tactical clothing and the level its main consumer properties (properties that satisfy the needs of the consumer - a soldier of the Armed Forces of Ukraine).

There are all objective and subjective reasons for the implementation of the indicated line of activity in the study of footwear as a component of tactical clothing. Among the objective grounds for effective functioning and prospects for the development of a new direction in the formation of state security of Ukraine, the following are especially important.

First of all, it is the rich experience of the expert activities of domestic and foreign subjects of judicial expert activity and the availability of experienced specialists and potential opportunities for training the necessary specialists in well-known domestic institutions of higher education in Ukraine and abroad. For decades these institutions have fruitfully cooperated with colleagues in the European Union and successfully adopted the experience of using modern methods of the world laboratory research [25, 26].

The second important reason is the state and positive features of the development of regulatory support for the process of laboratory research of the quality level of footwear in Ukraine.

More than 50 years ago, precisely in Ukraine, the fundamental theoretical-methodological and basic practical components of the system of laboratory methods of footwear research and the corresponding research methods were created, because the developers of most of the research methods in force at that time and those that are still in force today were scientists of the Ukrainian Scientific Research Institute of the Leather and Shoe Industry (USRILSI) [27].

But over the past decades, certain provisions and practical aspects of this direction of research activity have become morally obsolete [22]. Therefore, our country has taken significant concrete practical steps to eliminate this shortcoming. In particular, in accordance with paragraph 2 of the second part of Article 11 of the Law

of Ukraine "On Standardization", the order of the Cabinet of Ministers of Ukraine dated 26.11.2014 N 1163 "On the definition of a state enterprise that performs the functions of a national standardization body" and on the implementation of the National Standardization Work Program - State the enterprise "Ukrainian Research and Training Center for Problems of Standardization, Certification and Quality" adopted 30 State Standards of Ukraine only in 2020. They relate to the methods of researching the main indicators of consumer properties of shoes, such as vapor permeability and water absorption of the upper of the shoe and the lining; resistance to abrasion of the top of shoes, lining and insoles; resistance to repeated bending; resistance of insoles to delamination, resistance to sweat of main insoles, linings and insert insoles, etc. [28].

The main positive feature of these documents is their harmonization with the relevant international standards (ISO), which are valid in economically developed countries, as well as their novelty (adopted in Ukraine for the first time). Practically, this means that the study of footwear, which is a component of military products, will be carried out using the same methods and the same laboratory equipment as in the countries of, for example, the European Union, and the results of such study will be absolutely comparable with similar data obtained in other laboratories of the world. In turn, this will allow, for example, objectively (on the basis of digital data) compare any samples of footwear similar in purpose, conditions of use, etc.

In addition, the application of laboratory research methods will contribute to the establishment of objective ratings of manufacturers (suppliers) of military products according to the level of their consumer properties and their progressive development in the conditions of competition on the domestic and foreign markets [29].

In this aspect, the considered problem is related to the tender purchase of tactical clothing, since the only criterion for the purchase of these products for military purposes should not be the lowest price (cost), but rather the level of quality expressed in specific digital values of indicators of consumer properties.

The prospects for the development of the proposed new direction of research also fully concern food products, in particular, long-term storage (for example, food rations for servicemen of the Armed Forces of Ukraine and other military formations,

sets of field products, daily field sets of products, etc.), since the true actual quality level of this component products for military purposes can be objectively established only by laboratory research methods [30].

So, the above justifies the expediency of expanding the spheres of use of laboratory methods of research of objects of forensic examination at the expense of researching the level of quality of products for military purposes. On the example of the areas of research carried out by forensic experts of expert specialty 12.1 "Determining the value of machines, equipment, raw materials and consumer goods" and the analysis of the tasks that these experts are called to perform, the necessity of using laboratory research methods in the forensic commodity examination to study the level of quality of a component part of modern tactical clothing - military footwear - has been proven. It is expedient to use the obtained results in planning the development of areas of practical activity of domestic state specialized institutions of forensic examination.

Another relevant direction of scientific research aimed at solving modern problems of forensic expert activity is the search for scientifically substantiated sources of solutions to these problems [31].

One of the tasks of the Expert Service of the Ministry of Internal Affairs, stipulated by the relevant Regulation [32], is "organization and provision in accordance with the legislation of scientific research activities, implementation of its results." In turn, one of the results of scientific activity is scientific publications (Table 1).

Table 1

Data on scientific publications of employees of the Lviv Scientific Research Forensic Center of the Ministry of Internal Affairs of Ukraine

№ ¹⁾	The nature of the publication		Numb. of author.	Place of publications		№ ¹⁾	The nature of the publication		Numb. of author.	Place of publications	
	app	prof		ukr	abr		app	prof		ukr	abr
1	2	3	4	5	6	1	2	3	4	5	6
2022 year						39		+	4	+	
1	+		4	+		40	+		4	+	
2	+		1	+		41	+		4	+	
3	+		3		+	42	+		3	+	
4	+		1		+	43	+		1	+	
5	+		3	+		Σ	36	7	-	37	6

Continuation of table 1

6	+		3	+		2023 year					
7	+		1		+	1	+		1	+	
8		+	1	+		2		+	1		+
9	+		5	+		3		+	3	+	
10		+	5	+		4	+		2	+	
11	+		4	+		5	+		2	+	
12	+		4	+		6	+		2	+	
13	+		1	+		7	+		2	+	
14	+		1	+		8	+		2	+	
15	+		1	+		9	+		2		+
16	+		1	+		10		+	6		+
17	+		2	+		11		+	4	+	
18		+	5	+		12	+		1	+	
19	+		1	+		13	+		4	+	
20	+		1	+		14	+		1	+	
21	+		4	+		15		+	1	+	
22	+		3	+		16	+		1	+	
23		+	1	+		17	+		1	+	
24		+	6		+	18	+		2		+
25	+		3	+		19		+	1	+	
26	+		1		+	20	+		2	+	
27	+		2	+		21	+		1	+	
28	+		3	+		22	+		1	+	
29	+		3	+		23	+		1	+	
30	+		3	+		24	+		1	+	
31	+		3	+		25	+		1	+	
32	+		1	+		26	+		1	+	
33	+		3	+		27	+		3	+	
34	+		3	+		28	+		1	+	
35	+		1	+		29	+		3	+	
36	+		1	+		30	+		1		+
37	+		2	+		Σ	24	6	-	25	5
38		+	1		+						

In the table 1, the following notations are accepted:

¹⁾ Serial number in the Archive of scientific works (Lviv Scientific Research Forensic Center of the Ministry of Internal Affairs of Ukraine - Scientific activity - Archive of scientific works) for the corresponding year on the official website of the Lviv Scientific Research Forensic Center of the Ministry of Internal Affairs of Ukraine. URL: Scientific activity Archives of scientific works <http://ndekc.lviv.ua/naukrob.html>;

app – publication of an approbation nature (conference materials, a collection of theses of reports, etc.);

prof – publication in a professional publication;

Numb. of author. – the number of authors of the publication;

ukr – published in Ukraine;

abr – published abroad.

Despite the difficulties of recent years, employees of the Lviv Scientific Research Forensic Center of the Ministry of Internal Affairs of Ukraine find opportunities to publish their scientific works. In order to popularize these publications and provide an opportunity for all those who want to get acquainted with this scientific work outside its borders, the page "Archive of scientific works" has been created on the official website of the Center in the "Scientific activity" section [33]. On this page, there is a bibliographic description of each published scientific publication and the opportunity to familiarize yourself with its full text, as well as with the collection of materials (the corresponding number of the periodical, the collection of theses of reports, etc.) in which this publication was published.

Since the scientific publications of the employees of the Expert Service of the Ministry of Internal Affairs have been a source of gaining experience and solving problems of forensic expert activity for many years [34], the quantitative (Table 1) and qualitative analysis of the relevant creative output of the Lviv Scientific Research Forensic Center of the Ministry of Internal Affairs of Ukraine employees is of general scientific and practical interest.

Quantitative analysis of scientific publications of employees of the Lviv Scientific Research Forensic Center of the Ministry of Internal Affairs of Ukraine in 2022-2023 indicates a significant preponderance of works of an approbation nature, the share of which is 83.3% and 80%, respectively. Such scientific publications, as a rule, are small in volume (most often 2-5 pages) and do not require compliance with the rather complex requirements inherent in fundamental periodicals, for example [35]. In addition, the main objective reasons for the predominance of works of an approbation nature are:

- a significant number of scientific and scientific-practical events in which the Center's employees are offered or recommended to participate by the Expert Service of the Ministry of Internal Affairs of Ukraine (for example, only the Kirovohrad Scientific Research Forensic Center of the Ministry of Internal Affairs of Ukraine annually holds 4 meetings of a permanent international scientific -practical conference [36]);

- a significant number of scientific and scientific-practical events in which employees of Lviv Scientific Research Forensic Center of the Ministry of Internal Affairs of Ukraine participate at the invitation of educational institutions, specialized institutions, personal colleagues working with of Ukraine and from abroad, except for those proposed or recommended by the Expert Service of the Ministry of Internal Affairs of Ukraine;

- a full-scale war in Ukraine as an event that has an extremely negative impact on the creativity of scientists;

- the main professional activity of each employee of the Expert Service of Ukraine, which during the war significantly intensified, increased in volume, etc.

Regardless of the above, at least two positive trends in the structure of the scientific development of employees of Lviv Scientific Research Forensic Center of the Ministry of Internal Affairs of Ukraine are clearly observed (Table 1): in 2023, compared to the previous year, the shares of publications in professional publications increased (20.0% in 2023 against 16.7% in 2022) and publications abroad (16.7% in 2023 against 13.9% in 2022).

Publications in professional publications indicate in-depth study of scientific material and fundamental presentation of research results. It is very positive that they are based on the results of actual forensic examinations [37] and are a detailed example of solving specific factual problems that caused the appointment of these examinations.

Publications abroad indicate a desire to share experience with foreign partners, show our achievements to colleagues from other countries and encourage them to exchange experience. In addition, scientific publications by employees of the Lviv Scientific Research Forensic Center of the Ministry of Internal Affairs of Ukraine in foreign publications contribute to the growth of the image of the Expert Service of the Ministry of Internal Affairs of Ukraine outside our country.

Qualitative analysis of scientific publications (by areas of forensic expert activity, expert specialties, form and content of published materials, used information sources, etc.) is a separate fundamental analytical scientific research that requires considerable time and have significant volumes. Therefore, this article does not

conduct a qualitative analysis of the scientific publications of the employees of the Lviv Scientific Research Forensic Center of the Ministry of Internal Affairs of Ukraine.

Therefore, scientific publications of employees of forensic expert institutions are a source of gaining experience and solving problems of forensic expert activity and contribute to the growth of the image of the Expert Service of the Ministry of Internal Affairs in Ukraine and abroad. Quantitative and qualitative analysis of these publications allows the management of forensic institutions to assess objectively the state of scientific activity and develop scientifically based prospects for development.