

Fundamental Methods of Crime Scene Examination for Identifying Evidentiary Information

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Abstract—This paper examines fundamental methods of crime scene examination for collecting, identifying and documenting evidentiary information during preliminary investigation. It features analysis of theoretical and applied forensic technology usage methods practiced in the Republic of Tajikistan and other countries. Problem areas related to the examination of a crime scene are determined in the context of obtaining investigative and evidentiary information. This research highlights issues with professional knowledge, skills and capabilities of parties that collect and document the evidence in criminal cases. Requirements for professional knowledge, skills and abilities of forensic specialists, investigators and forensic experts that participate in the scene examination are determined. Based on conducted analysis, the author draws critical perspective conclusions and proposes methods to improve forensic technology usage methods currently practiced by crime scene examination in Tajikistan.

Keywords—*forensic evidence; crime investigation; crime scene examination; proof; traces*

I. INTRODUCTION

In the course of researching forensic technologies and organizational methods for crime scene examination as the object of forensic research in the Republic of Tajikistan [1; 2], we have observed that crime scene evidence processing, i.e. collection and preliminary examination, pursues not only tactical goals (i.e. immediately applying obtained information for hot pursuit), but also strategic ones (i.e. establishing such evidence base for a criminal case that is sufficient to investigate and solve the crime and prosecute the person responsible for it). Forms of forensic research and evidence usage methods as sources for evidentiary information and criminal intelligence to some extent depend on processing stages, their substance and purposes of performed activities [3].

On this basis, four main types of processing crime evidence as sources of investigative and evidentiary information can be established:

- 1) preliminary examination of evidence and traces at the scene in order to reconstruct and identify circumstances of the crime, as well as to obtain the maximum possible information on a person(s) who committed the crime;

- 2) preliminary examination of evidence in order to determine its causal link to the criminal act, possibility of identification and establishment of grounds for filing criminal charges;
- 3) matching of evidence against criminal records and forensic information systems, and its usage in hot pursuit;
- 4) usage of evidence to plan the investigation, develop and verify crime scenario versions, appoint and perform forensic examinations, and create the evidentiary base in a criminal case.

These usage types for evidence collected at crime scenes are implemented in two ways that are traditional in forensic science and criminal proceedings: procedural and non-procedural. The difference between these two ways stems from the substance and objectives of evidence processing, and differ by types of examination that are defined by current legislation and developed practices, order of requesting and conducting them, as well as legal assessment of the results.

In our view, the combination of these types of using forensically relevant information collected by inspecting crime scenes is to be generally considered one system which consists of elements in a certain order [4; 5].

II. PROBLEM STATEMENT

Preliminary examination of evidence and reconstruction of a criminal act pursues multiple goals and objectives: from detection, capture and collection of evidence, identification of crime act circumstances in general, to reconstruction of the criminal's appearance and offender profiling. As for technological aspects and issues of forensic examination, this topic was covered in our earlier research. For this reason, the current research is focused on analysis of effectiveness of forensic experts conducting assigned tasks.

Based on the content of crime scene examination protocols reviewed for this research, forensic specialists participated in examination in 83% of cases. 72% of them were effective, i.e. trace evidence was collected. At the same time, as noted earlier, from all the collected evidence more than half is represented with fingerprints, which indicates not only a certain focus of forensic specialist's attention when they examine the scene, but also the level of their professionalism.

It should be considered that a fifth of these traces (21%) was unfit for identification or was left by persons not involved in the crime. A forensic specialist has to deal with these obstacles but they have a clear negative effect on a specialist's performance.

It is appropriate to emphasize that according to the results of a comparative data analysis of the crime scene examination protocols and surveys of persons that committed corresponding criminal offence, only one of three/four pieces of evidence left at the scene is collected. Little attention is paid to different micro-objects, substance micro-quantities and biological traces. Results of the evidence collection at the crime scene and their preliminary examination entirely depend on the initiative of a forensic specialist. This is clear from a specialist's procedural status as a participant of the investigative action which is set out in the Criminal Procedure Code of the Republic of Tajikistan [6]. However, according to V. Tkach, "the absolute majority (92%) of the interviewed forensic experts that acted in this capacity noted that they consider their participation in the scene examination to be quite successful if they contributed to a discovery of at least one fingerprint. Processing other traces, especially micro-objects, is too complicated (64% of respondents), labour-intensive (52% of respondents) and time-consuming (61% of respondents)" [7]. At the same time, the preliminary examination of crime scene evidence was carried out only in 11% of cases. These responses clearly express a common attitude of forensic experts regarding their activities at the scene. In the Republic of Tajikistan, this issue is manifested in a similar way, which is confirmed by a number of studies [8; 9].

In the activities of forensic specialists, this factor plays quite a significant negative role in specialists' self-assessment of capabilities to investigate and solve the crime, uncertainty in legal evaluation of preliminary examination results for discovered traces and other objects, as well as procedures of recording evidence and determining its weight. It leads to troubles with legal authentication: introduction of this kind of information into the evidentiary process and determining the weight of the evidence.

III. PURPOSE OF THE STUDY

Early researches in forensic science raised the question of preliminary examination of a crime scene and trace evidence, as well as registration of results in a separate document, for example, in a certificate from a specialist [10; 11]. In this regard, it should be noted that a scene is referred to as one of the objects of the investigative action and needs to be examined together with the premises and other objects and documents, in order to collect evidentiary information. Other objects are examined, above all, in the course of the scene inspection and results are recorded in the report for this investigative action. A typical example is the examination of a corpse. The question then arises, "In some difficult situations, for example, when there is a risk to damage the object, why not to conduct an independent investigative action and inspect it directly at the scene?"

Essentially, in this case such inspection for a forensic specialist will be equal to a preliminary examination of trace evidence at the scene, in order to establish its origin, identification attributes, causal link to the criminal act, etc. Such approach, in our opinion, helps to increase the responsibility of specialists and enhance their role in the preliminary investigation, reduce the investigation duration, prevent active opposition to it. From a psychological point of view, the fact of completing work and recording it in documentation mobilizes a forensic specialist, establishes its importance in the line of investigative team's action.

IV. RESEARCH METHODS

A methodological basis of the research is common and specific scientific methods of scientific knowledge: comparative legal, systemic structural, sociological, formal logical, logical legal ones, as well as statistical analysis and generalization. Such methods as analysis, synthesis, induction and deduction, as well as observation, comparison, reconstruction are also used.

V. RESULTS AND DISCUSSION

Analyzing results of participation of forensic specialists in the examination of crime scenes and taking into account that results of preliminary investigation of trace evidence are not reflected in the inspection protocols, E. Selina proposes to introduce the following investigative action as a particular type of examination to The Code of Criminal Procedure of the Russian Federation: investigative examination [12]. In our opinion, the idea to change a legal status of the results of examination conducted by a forensic specialist deserves attention. Indeed, if a legislator accepts the specialist's statement and testimony as evidence, and does so without verification, then why not accept results provided by a specialist during crime scene investigation and treat it as an investigative action carried out under the same law prior to the initiation of criminal proceedings.

However, this idea of an independent investigative action does not seem to us to be well grounded. Firstly, the investigative action is conducted by an investigator rather than by a forensic specialist; secondly, no conclusions should be derived when the action is performed; thirdly, besides comparative studies typical for identification, forensic specialist also carries out diagnostic ones. It is obvious that from a logical point of view it is better to document forensic results as an examination report attached to the on-site investigation report, along with photo and video recording.

Researching this topic, I. Prokopenko mentions cases when commissioned forensic experts get samples that were not requested for forensic research, or do not get any evidence at all; previously received evidence is featured in the examination results. He concludes, "It is quite obvious that such expert's report will be excluded from the evidence base when carefully examined in court" [13].

This is not the only drawback. In the expert's report, samples submitted for analysis are described in the form they have at the moment examination is requested, after criminal

proceedings have started. The expert points out that the samples are packed and sealed by the forensic crime scene unit; an expert signature and corresponding explanatory inscriptions are in place after the previous evidence examination. Such practice presents significant difficulties. Firstly, the defense demands an explanation why and on what grounds the evidence with witnesses' signatures was unpacked. No document that states specified samples were handled in any way should be added to a criminal proceedings file since specialist's records do not have evidentiary value and cannot be filed. Secondly, if the evidence was completely destroyed (used up) during investigation prior to the initiation of the criminal case, it excludes the possibility to request examination and obtain necessary evidence, respectively. Thirdly, if the evidence was partially destroyed (used up), the investigator will have to explain the reason why seized samples and ones submitted for expertise differ (especially in cases where the difference will be crucial for the correct legally qualification of the act).

Such practice is reviewed by V. Volynskii and other scientists [14; 15].

In our opinion, in order to regulate examinations conducted by specialists and usage of their results as evidence, it is necessary to introduce an additional chapter to The Code of Criminal Procedure of the Republic of Tajikistan: "Expert conclusions and statements". In it, on the chapter-by-chapter basis, there should be determined the order, grounds and reasons for the examination appointment, procedures for obtaining samples and preparation of other materials, rights and obligations of the parties in the criminal proceedings when examination is appointed, requirements regarding form and substance of the specialist's conclusion, etc. It is also necessary to legally determine guarantees of objectivity and credibility of specialist's conclusions in order to exclude the possibility of abuses in the investigation. For this purpose, it would be useful to add a provision on criminal liability of a specialist for filing false conclusions to The Code of Criminal Procedure of the Republic of Tajikistan [16].

Polarized opinions are sometimes expressed in discussions on the role of forensic specialists at the crime scene, which is directly related to the organization of their work and legal assessment of its results. For example, S. Smirnova claims that they should function only as forensic assistants and consultants for the investigator [17]. We believe that this approach not only states the auxiliary role of specialists during scene examination as an investigative action (which is basically true), but also determines a passive, non-initiative attitude to performing their tasks. The latter contradicts the very nature of the scene examination process, especially when it is conducted in the form of a tactical forensic operation.

According to other forensic scientists, a specialist solves simple diagnostic tasks that do not require complex technical means. Results of his research actions can only be demonstrable facts available in the public domain and clear for all participants in the investigative actions, including witnesses who testify to these facts. It is argued that the main difference between an expert and a specialist is that the latter does not conduct a research [18-22]. We cannot fully agree

with this statement. In our opinion, even by searching and collecting evidence, a forensic specialist at least to some extent uses a research approach to solve the problems related in the case. The tasks solved by a forensic expert at the crime scene cannot be described as simple and diagnostic.

According to the current forensic experts, it is often much more difficult to find, record and file a fingerprint than to conduct a comparative study of a fingerprint on the fingerprint card during forensic procedures. If we bear in mind a task of a systematic, comprehensive analysis for the crime act reconstruction, and the use of its results in hot pursuit, given that forensic experts often conduct comparative, i.e. identification research (rather than only diagnostic one), then it is simply incorrect to compare complexity of their research on-site and in the laboratory.

Of course, an expert who specializes on a certain branch of scientific knowledge and has a relevant experience has a deeper expert knowledge: he professionally examines specific samples, while a forensic specialist deals with a huge variety of such samples. Accordingly, the latter should have a broader field of knowledge and range of skills. In a way, a specialist needs to be versatile and have the ability to work with a variety of evidence of different types and origin. As we see it, it is a reason A. Volynskii called crime scene examination "the most complex expertise" that is crucial for investigating and solving of crimes [23]. Similar views can be found in researches by other forensic scientists [24].

An expert and a forensic specialist in the investigative action, of course, differ in their tasks, forms of activity, practiced forensic methods. However, in our opinion, special attention should be paid to what is common between them. First of all, it is a crime scene that is an object of their forensic research; the ultimate goal of such research is to investigate and solve a crime; a common methodological framework to achieve this goal. Oversight of a forensic specialist at the scene can never be compensated by his expert research, i.e. expert examination [25-28].

The problem of a specialist and his conclusions is directly related to characteristics of a criminal records system, which registers not only certain objects (usually these are samples from a crime scene) but also their comparative research. The results of such research (record matching) also have no evidentiary value until they are confirmed (i.e. replicated) during expert examination.

Analysis of the existing system of criminal records, as well as the legal bases for the whole forensic registration system functioning, shows that, in the end, citizens, persons are registered (directly or via their features and properties that are related to the crime evidence in particular). The fact remains that a forensic records system created and remaining in the area of the Ministry of Internal Affairs' responsibility is in fact an interdepartmental information search system that gradually updates its IT infrastructure to meet modern standards [29]. Its capabilities are used by other law enforcement agencies and their services (including ones created in recent decades). However, its functioning is still regulated by internal legal acts of the Ministry of Internal Affairs, which, strictly speaking, is

not compulsory for employees of other ministries and departments [30].

In view of these facts, it seems reasonable to raise an issue of a higher level of legal regulation for the criminal records system functioning. Moreover, taking into account that its functioning directly concerns the rights and freedoms of a man and a citizen, we do not exclude the possibility of legislative regulation.

From an organizational point of view, it is important that the investigative team, when on site, has a stable access to the criminal records base, which allows for transmitting, verifying and receiving information, including video, in real-time. Thus it can fully use a whole range of reference forensic records, such as files, collections of reference objects, etc. [31] The speed of access will increase efficiency of the criminal records system for crime solving, starting from scene examination, and will contribute to credibility built among investigators and their teams.

After the scene is fully examined, problems also arise. Seized at the crime scene, evidence, which is an annex to the investigation record, shall be retained by the investigator. At the same time, investigators sometimes forget about it and fail to send them for preliminary and expert examination, while experts (here, an expert stand for a forensic specialist) demonstrating their procedural independence, simply consider it unacceptable to show initiative in these matters.

VI. CONCLUSION

Based on this research, we recommend that evidence collected during crime scene inspection is immediately, upon completion of this investigative action, passed to a forensic specialist, together with an assignment letter from the investigator (similar to the expertise request act) to conduct a preliminary examination and to answer indicated questions, including those about evidence matching against criminal and forensic records and registration. By a current investigative Internal Affairs department management system, this proposal can hardly be put into practice as single-discipline specialists (physicists, chemists, biologists, maintenance engineers, etc.) often participate in the crime scene examination according to their duty rosters. This system is ineffective since, as previously mentioned, at a crime scene evidence of different types and origin is discovered.

Examination of the scene and collecting trace evidence is also specific because, in the historical perspective, results of the advance of science and technology constantly expand the capabilities for investigating identity of the offender, finding out his motives and characteristics. In criminology, special focus is put on the possibility of identity modeling for an unknown offender already at the stage of scene examination. We share the optimistic view regarding this issue. Examination of the scene allows for retrieving information about the type and nature of the offender; a method, place and time of the committed crime; a victim or a subject of crime, etc. On the basis of this information hypotheses on the matter of offender's identity are put forward, and a reconstruction is created to be used in search. The so-called psychological and forensic profiling method is used [32]. This is the most

suitable solution to this problem, if one gathered the maximum possible information about the unknown offender, which is achieved after all the initial investigation actions, examinations, researches are performed.

At the crime scene, the information available is, of course, more limited but we emphasize that a significant part of it, in terms of quantity and quality, is obtained at this stage, and can be used to reconstruct the appearance and profile the offender.

The most informative part is traces of the offender and crime act reconstruction that reflect offender's personal characteristics, the method and mechanics of a crime. By examining evidence at the scene, a specialist can establish social and professional affiliations of the offender, special skills if he or she has any, special characteristics of his personality and a state of mind, character, physical appearance. This data can be acquired from evidence that displays the criminal (i.e. parts of his body), including traces left on clothes and the victim's body (micro-particles, scratches, etc.); thrown out or accidentally left evidence (an empty pack of cigarettes, a cigarette stub, a weapon of a crime or its parts, etc.); traces of substance (blood, saliva, urine, etc.) [33-35].

The sources of such information not only result from the scene examination. They also include additional data on the criminal act, investigative information, explanations of witnesses, matching results of criminal records, reference materials used, results of the express analysis of collected samples, experience and professionalism of the investigation team. An example of a scientific approach to reconstructing identity of an unknown criminal (killer) using specifically designed algorithms can be found in a research by L. Vidov [36].

The results of retrospective reconstruction of the unknown criminal's identity during crime scene examination then form the basis for prospective modeling, contribute to establishing possible actions of the criminal (his or her location, weapon of crime handling, further criminal activity, etc.)

For further professional development, at least targeted training of specialists, in form of short-term or work sessions, should be arranged. However, this issue is a topic for a broader research.

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