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# METHODS OF DOCUMENT FORGERY AND THEIR DETECTION PROBLEMS

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## Abstract

In this article, the types of forgery of documents, the methods and tools used in forgery are analyzed, and the mechanism of appearance of traces and signs of forgery of documents is researched. Also, the elements that can be changed in the text of the document are divided into separate categories and analyzed. The second part of the article is directly devoted to the problems of identifying the elements of forgery, in which the methods and tools used to identify the signs of forgery are analyzed from a criminalistic and technical point of view.

**Keywords** Forgery, falsification, alteration, forgery of signature, forgery of seals and stamps, forged letterhead, wet copying, spectroscopy, luminescence.

## INTRODUCTION

Depending on the volume of actions taken in connection with the preparation of a forged document, a distinction is made between full (reproduction of the entire document) and partial (change of individual details in the original document) forgery. That is, there are two types of falsification of documents: falsification and alteration. The first type is that the general form of the document is correct, and the information in it is completely or partially false. For example, in the document on the expenditure of material funds, it is understood to issue false information. The second type is the illegal change of the primary data in the documents (adding additional changes, erasing, tampering, etc.).

The methods of forgery of documents are constantly being improved [1] so it is necessary to improve the methods of cooperation and their detection[2]. Crimes of looting other people's property in various ways are often committed using forged documents. The information in the seemingly correct and legally formalized documents is far from the truth, and criminal

elements use it for their own benefit and display fake documents in official document forms. They confirm it with signatures and seals in accordance with the rule, giving it a real, legal tone. [3]

In the process of investigation of such crimes, to determine the forgery of the documents, it is decided by checking the information in the suspicious document and determining whether its content corresponds to the information in another copy and does not correspond to the documents reflecting the next operations. Sometimes such information can be obtained as a result of reviewing the records reflecting the response of materially responsible persons.

The most common types of partial counterfeiting [4]:

- 1) changes that can be made by washing, adding, changing or erasing the text of the document;
- 2) replace the photo;
- 3) replace pages in a multi-page document;
- 4) falsification of traces of printed identification forms (seals and stamps);

5) imitation of a signature (forgery).

Making changes to the text of a document includes changing its content by hand writing, typing or using electrophotographic devices and inkjet printing devices. When checking cases of forgery with material changes to documents, you should pay attention to the following signs.

1. Delete some entries (letter, number, signature) in the text of the document and replace them with another entry. As a result of erasing, the upper smooth layer of the paper is damaged. The fibers of the paper are wrinkled and slightly changed in color, some lines of the inscriptions in the erased place and remnants of paint are preserved. If the text of the document is made on a special form, then the embroidery and typography lines on the surface of the paper are additionally damaged. In order to remove the inscriptions, the upper layer of the paper is cut and erased with a sharp tool. In such cases, it will be possible to restore the content of the erased writing based on the concave traces of the previous writing when observing the light from the back of the paper.

When writing a new text or numbers needed for a criminal purpose instead of the deleted notes of the document, due to damage to the upper layer of the paper, particles of the pen and paste ink spread and penetrate into the inner layer of the paper. In addition, it will be possible to observe some difference in the color of the paint of the next inscription with the paints of the primary writing. [5]

2. Making additional entries, numbers and other changes to the text of the document. In this type of forgery, numerical symbols are changed when adding additional entries to the previous text of the document. Some parts of the numbers are changed in order to increase or decrease it. Additional entries differ slightly from the general distortion, placement, and other features of the primary text.

Additional entries differ slightly from the general distortion, placement, and other features of the primary text. In addition to letter signs, the above-mentioned signs are also present when additional words, numbers and other writings are entered in the composition of the paint, which is a writing tool

(there will be a color difference that cannot be seen by the naked eye). Additional records are easily identified by experts through digital processing. [6]

When additional notes are added to the typewritten texts, there will be the location of the letters, the interval (interval) of the line, the difference in the composition of the typographic paint, and other signs that are present in the sealing tool itself. [7]

3. Discoloration and washing of writings in the document.

The text in some parts of the document or the entire text is discolored with various chemicals and the necessary notes are written instead. As a result of the action of the reactive substance, the composition of the paper changes somewhat, the fibers are broken. When writing a new text instead of lost, discolored notes, the ink of the writing tool (pen, paste, ink) spreads a little and gets absorbed into the inner layer of the paper.

By observing the document under ultraviolet light, it is possible to identify changes in it, spots of paint left over from the previous writing, and places affected by chemical substances. It happens that the text of the document is discolored by washing it with liquid water. In this case, the remaining stains of the previous writing embedded in the paper are restored by observing and photographing them by intensifying their color in different light.

4. Changing the photo and stamps in the document (sticking another one instead of the original one).

Photographs affixed to personal documents usually have a stamp on the lower right or left corner. A stamp and a part of the signature are also displayed on the same affixed stamp. When a photo or stamp is copied and replaced by others, the image of the stamp is drawn by hand or confirmed with another seal. In this case, the general structure of the seal, the general and specific signs of the inscriptions located on the circle will change. By observing and examining the back of the photos and stamps, it is possible to determine the type of glue used in the previous and subsequent rows.

5. Technical forgery of signatures.

Fake documents are copied with the help of duplicating paper or by exposing the document to the light, and then using a writing tool to cast the shadow of the signature on the fake document. In these cases, it is observed that the movement of the writing in the forged signature is somewhat weakened, the lines are thickened and the flatness is disturbed. As a result of examining the document in different light, it will be possible to see the signs of pen and pen stop movement and particles of copier ink in the lines of the fake signature.

#### 6. Forgery of seals and stamps.

The fake seals and stamps themselves are made by hand or, on the contrary, they are drawn by hand. In the standard form of artificial seal stamps, the sizes of circle, rectangle, and triangle types differ. Signs such as letter forms, distortion, size, and mutual arrangement are created. For example, a hole left by a circle, when drawing with a pencil and pen, there are signs of stopping in one or two places of the movement.

There is also a method of slightly moistening the image of the real seal in the document and placing it in the desired place of the fake document. In this case, the paint on the seal will spread and the color will fade. The inscriptions and the image marks in the center of the seal are unclear. Several methods are sometimes used to forge images of stamps. In the process of examining the copies of the seal-stamp on the fake document, it is necessary to determine which institution, ministry, department - enterprise it belongs to, to compare it with the samples of the original copy, to pay serious attention to its general distortion, the arrangement of letters, and the standard form.

#### 7. Making a fake form of documents.

This method is often used in the preparation of personal documents (diplomas of higher or secondary education, car passports and personal driver's licenses), as well as in the forgery of money and valuable papers (bonds, lottery tickets, checks, promissory notes, etc.). Criminals use various machine tools and technical equipment to make forms, along with painting and polygraphy. Typographical inscriptions on a forged letterhead differ from the general standard structure by the

composition of paint, color, and letter structure. The material, paint, glue, and composition used in making blanks also differ depending on the group affiliation.

The following signs are formed during the production of fake money and securities: the absence of microscopic embroidery and text on the inner and outer layers of the paper that has a special protective agent, the use of different types of chemical agents included in the composition of the paper, etc.

Criminals also use modern technical equipment and the method of assembling parts of several documents together to forge documents.

In order to observe and identify the above-mentioned signs of forged documents, it is necessary to master the techniques and methodologies developed in criminalistic techniques, as well as to be able to use modern technical tools.

Inspection of documents in a technical way is carried out with the help of a number of optical devices, using ordinary magnifiers, microscopes, devices, various light sources.

If damaged and erased documents are observed by placing them in the light source, the level of penetration of light rays through the paper layer will be different. In such conditions, when counterfeit money, valuable paper - documents are also observed in transparent light, the conditions of the inner layer of the document are full and clear. The way to strengthen this condition is to photograph in transmitted light rays. A special light source for photography is installed on FMN-2, MRKA, ULARUS devices. Inspection and photography are carried out in a darkened building.

In order to restore the texts of documents whose inscriptions have been erased, discolored and partially burned, the inscription has become invisible, it is necessary to give them the right perpendicular direction of light. To distinguish the colors of the inspected object and determine the difference between them, light detectors, i.e. devices that distinguish colors, are used.

Each of the color filters is provided with

information about which position of the spectrum it is used for and its capabilities. These filters are used to make visible and restore unreadable, painted, copied, discolored records according to the inspection task.

A filter of the required color is placed in front of the light source in order to isolate the necessary light of the spectrum and observe it through the lens. For example, if it is necessary to conduct an examination in red light, the "KS" filter is used, the filter passes red light and does not block others.

The light in the reflected electromagnetic field of long-wave infrared rays affects almost all writing materials (ink, paste, pencil, colored pencil, felt-tip pen, consumer paints), separating them in terms of color and making visible the inscriptions under the indicated paints. It has the ability to absorb long-wave infrared rays through materials such as graphic pencil, black ink, black typewriter tape, copy paper, typography inks, heavy metal salts, iron, copper, chrome [8].

Ultraviolet rays are used to restore the discolored, washed, and lost writings written with invisible substances using chemicals. Electromagnetic light of short-wave ultraviolet rays is absorbed into the content of the examined object and forms a light reflection from it. Mercury quartz lamps with high pressure and different powers serve as sources of ultraviolet rays.

Luminescence inspection in the infrared spectrum is used to detect various changes in forged documents, because the effects of ordinary visible light are not enough to restore records. As a result of the effect of infrared rays, the examined object emits a reflective light, this condition is called luminescence. The text of the same document illuminated at the same time and the subsequent changes made by the effect of infrared light emits a special reflected light rays and makes even small particles that are invisible to the eye visible.

Wet photocopying method is used to wet the emulsion (gelatin) layer of photo paper to determine the changes in the texts written with paste, the color and composition of the paint. The absorption-luminescent method is also used in the examination of forged documents. This method

solves the need to determine which was written first in the places where the notes in the document intersect (for example, in cases where the signature is written on top of the other).

The ultraviolet-visible spectroscopy method is used to determine the type of writing instrument, the quality of colorless substances, the quality and type of adhesives. The main feature of the tested substance is the drawings made on the basis of spectrophotometry analysis, that is, since the ability of each substance to absorb spectrum light is different, the spectrum graph is reflected accordingly.

The infrared spectroscopy method is also used to perform the above-mentioned tasks and to perform comparative checks. Uses the chemical droplet reaction method to test the properties of writing materials on paper, glue and other materials. [9]

As for the method of non-identifying expert research in this classification system, it should be noted that unlike the research method, the expert's methodology is an algorithm of actions of a forensic expert in solving the task assigned to him. It consists of a set of methods and technical tools used in a certain sequence, in pre-existing or necessary conditions. It follows that the concepts of "method" and "methodology" are not unambiguous (equivalent) and it is not possible to include expertise methodology in the classification system of expert research methods [10]. However, the use of modern technologies has a positive effect not only on criminalistic research, but also on rapid search and investigative activities [11].

In conclusion, it is necessary to evaluate that the whole process that can be caused by the study of this or that document is conditionally divided into three groups. The first group includes the basics of document production and collection of materials. These are typewriters, production of all working printing; identification of the document or the material from which it is made. The second group needs the documents necessary to identify the methods of forgery in the documents. These documents also take into account signs of full or partial forgery in the document. To the third group - based on the assessment of the group relevance

and diagnosis of the document, it provides: evaluation of the document from the report; reading erased, discolored texts and notes in documents.

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