THE ISSUE OF USING TECHNICAL EQUIPMENT FOR THE DETECTION OF FORGED DOCUMENTS IN THE FIRST AND SECOND LINE OF CONTROL

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Abstract: *The study examines issues related to technical equipment for document verification and detection of forged documents in the first and second line. Today, counterfeiters use increasingly innovative methods and equipment, which necessitates the improvement of technologies for identifying counterfeit documents. The novelty of the research lies in the comparative analysis of the work efficiency of technical equipment in both the first and second line, with the aim of detecting and detecting various types of forged documents. The goal is to analyze the effectiveness of currently used technical equipment and the problems that can be encountered in the study and detection of forged documents. The procedure itself during border control is analyzed for them, as well as solutions to problems are given. The main tasks are the specifics and available functions of the existing technical equipment, solving problems in the use of these technical equipment, offering solutions.*

Keywords: *border check, documents, equipment, forgery detection methods, UV light.*

The detection of counterfeit documents is a crucial element in the border control and national security system. Today, with increasing migration flows and the activities of organized crime groups, document forgery methods are becoming more sophisticated, making the effective use of technical equipment critically important to ensure border security and prevent the use of counterfeit documents. The aim of the study is to analyze the use of technical equipment and assess the issues that arise in the process of detecting counterfeit documents, as well as to propose possible solutions to mitigate these problems.

Forgery, by its very nature, could be considered a form of materialized lies, which also includes the counterfeiting of documents (Mincs & Liholaja, 2005).

Document forgery can be categorized into the creation of a false document and the counterfeiting of a genuine document. Forging a document, seal, or stamp, as well as the use or distribution of forged documents, seals, or stamps, is a criminal offense. (VRK, 2024) Such

violations can be punishable by imprisonment for up to one year, short-term detention, probation supervision, community service, or a fine.

If these actions are carried out with the intent of financial gain, with prior agreement by a group of individuals, or if they have caused significant harm. (VRK, 2024). The penalty may be more severe—up to four years of imprisonment, short-term detention, probation supervision, community service, or a fine (Krimināllikums, 1999).

In the context of the Criminal Law, document forgery is defined as an act where a genuine document is replaced with a forged one, or alterations are made to a genuine document, such as erasure, etching, or correction. The first part of the mentioned article provides for liability for a criminal offense, while the second part applies to a less serious criminal offense (Krastins et al., 2007).

The Schengen Handbook stipulates that a full check is carried out for third-country nationals, i.e., those who are not citizens of EU or Schengen Area member states. This check is performed to ensure that they meet all the conditions for entering or exiting the Schengen Area (Robežsargu rokasgrāmata, 2019).

In addition, a supplementary document check can be conducted in what is known as a "second-line check." This is an in-depth inspection carried out in a designated area located outside the main control zone (first line), where all persons are screened (Robežsargu rokasgrāmata, 2019).

A second-line check may be conducted if there is suspicion or a need for further examination regarding a specific person or their documents (Regulation of the European Parliament and of the Council, 2016).

The first line, where the initial check takes place, is equipped with simpler inspection tools, while the second line uses more detailed and specialized equipment (United Nations Escap, 2024). However, both lines face various challenges related to the technical capabilities of the equipment, as well as human factors and time constraints.

Documents are widely used in various fields of human activity, which increases the likelihood that individuals may forge them more frequently. Therefore, timely and accurate verification of these documents is crucial to ensure their authenticity.

The amount of technical equipment required for border checks in State Border Guard units is determined by the Chief of the State Border Guard, taking into account the tasks to be performed by each respective unit, the scope of those tasks, as well as the unit's location and operational tactics (VRK, 2024).

- For more effective execution of border guard tasks, various technical tools are used depending on the specifics of the task. The Cabinet of Ministers' Regulation No. 675 of July 27, 2010, "Regulations on

Technical Equipment Required for Border Checks and Border Surveillance," defines the technical tools necessary for task execution (Regulations of the Cabinet of Ministers, 2010).

These regulations ensure that the use of technical equipment follows standards that guarantee the quality and accuracy of inspections (VRK, RTA, 2024). Without appropriate regulations, the use of technical equipment would be less effective for successfully detecting document forgeries.

The technical means of border control used for the inspection of persons, land vehicles, railway transport, aircraft, as well as vessels and the cargo and other items transported with them at border crossing points are (VRK, 2024):

- Equipment for primary document checks – for the inspection of personal and vehicle documents, as well as other legal documents presented at the border crossing point, for the verification and identification of individuals and presented documents;
- Devices for the automated reading and verification of visual and coded data in documents;
- Optical magnification devices with illumination;
- Illumination devices with different wavelengths (VRK, 2024).

Document authenticity verification is essential in various contexts to ensure that documents are genuine and lawful. Document authenticity checks help identify forged documents, which can be used for fraud or criminal activities. This verification prevents the use of illegal documents, such as forged driver's licenses or residence permits. During first-line border checks at the state border of the Republic of Latvia, the following document verification devices are used:

- Stationary document verification devices Regula 4205D.01;
- Mobile document verification devices Doculus Lumus DL 15x;
- Video spectral comparator REGULA 4305DMH.

Thus, the authors conclude that, in order to effectively prevent document forgery and ensure the security of national borders, it is essential to continuously develop technical equipment and improve border guards' training. Modern document verification devices help identify increasingly sophisticated forgeries, but the human factor and skills in using technology still play a significant role. Therefore, it is necessary to continue enhancing both the technical capabilities of the equipment and the skills of border guards to ensure accurate and timely document authenticity verification. Only in this way can the use of illegal documents be successfully prevented and the national security system strengthened.

Stationary document checkers are an essential tool for border control, ensuring efficient and accurate document checks. One of these technical

devices is Regulation 4205D.01, which is designed to help detect forged documents. In the following, the authors will provide a detailed description of the working capabilities and technical specifications of the Regulation 4205D.01 and provide a vision of how this equipment can help to improve the efficiency of border controls.

Stationary document inspection equipment Regulation 4205D.01 shall provide first line document inspection. Its intuitive interface and fast multi-touch interaction reduce the complexity of document verification, making the process more efficient and less burdensome. The enhanced capabilities for document authenticity verification at the first line improve the overall operational efficiency of border control by identifying a greater number of forged documents (REGULA, 2024). This device is equipped with light sources such as side light, top light, ultraviolet light source (365nm), top white light source, coaxial light source, or oblique beam light source, and a combined (holographic) light source, as well as infrared light sources (JPJuniper, 2024).

Regulation 4205D.01 has a number of advantages in terms of documentary checks for border checks, but often results in situations where lower efficiency is encountered.

Regulation 4205D.01 is not mobile given that it is a fixed document checking machine. It creates difficulties in the document checking procedures when the checking takes place outside the border inspection posts. Problems are sometimes encountered during document checks with high flows of people and vehicles, when insufficient processing speed and capacity constraints can cause congestion at the border checkpoint. Regulation 4205D.01 is designed for automated document checking, so officers also need to be able to deal with technical issues, including manual document checking where necessary, if they suspect the use of fraudulent documents.

The authors conclude that today's modern and advanced technologies, such as Regulation 4205D.01 , significantly improve document verification, both in terms of professional document verification and the identification of fraudulent documents. Despite the fact that various types of technical equipment help and facilitate the work of officials, well-educated and professionally trained staff are essential. Any device cannot provide one hundred per cent security and quality but competent officers. The use of fixed equipment can can cause problems in situations where there is a large flow of vehicles or people at the border, which can lead to congestion. Anyone should be able to be flexible and adapt quickly to different changing circumstances.

Additional strategies, such as the use of mobile augmentation devices and timely and in-depth training of officers, should be developed to

improve document control procedures. This aspect would allow for a better and more effective quality of document checks. Clearly, mutual cooperation is also a very important aspect. Cooperation in ensuring effective border control, which should be established between different types of organisation. Cooperation requires the exchange of information on authentic and forged documents.

Fig.1. Stationary Document Inspection Equipment Regulation 4205D.01 (Regula, 2024)

Another document checker that will be discussed is the Doculus Lumus DL. The Doculuc Lumus DL is a portable document checker with 15x magnification, designed for first line authentication of documents.

It is very compact with innovative technological features, allowing officials to carry out efficient document verification both at border crossing points and beyond. A more in-depth description of the Doculus Lumus DL is provided below. Doculus Lumus is a portable/mobile document checker used primarily first line. Undoubtedly, given the functionality of the machine, it can be used for second-line verification as well as for in-depth forensic investigations.

The inherent working specificities of the Doculus Lumus have been developed to meet the requirements of rapid document verification, helping to authenticate documents. Doculus Lumus is specifically designed to meet first and second line verification, offering improved performance and reliability.

Doculus Lumus is equipped with high quality UV light of different wavelengths that can capture and display specific dyes. Built-in carskate light function s and watermarks in documents that are not visible to the naked eye. Using UV light, it is easy to detect signs of authenticity and to detect forgery attempts. Doculus Lumus can identify colour pigments, inks and paper types and detect any deviations from the original composition of the document.

Doculus Lumus can be connected and used with various additional software - USB, Bluetooth and Internet connections, thus making it easier to integrate with other document verification systems (Doculus Lumus, 2024).

Doculus Lumus is a mobile/portable document inspection machine whose performance can be affected by a variety of factors. Mobile/portable document inspection equipment often has limited battery life. Prolonged use or the need for frequent battery charging can cause problems, especially in the process of increased intensity. The professional use of mobile/portable equipment necessarily requires special - specific training to ensure that the users of the equipment can effectively use all available equipment functions. If the training is not provided in a high-quality and detailed scope, it will lead to incomplete use of the equipment and the achievement of inaccurate, low-quality results.

Mobile/portable document inspection equipment is also sensitive to various environmental factors, such as: humidity, temperature fluctuations, dust. These factors can affect the completeness of the equipment and the accuracy of the data. The longevity of the document inspection equipment is also affected in this way.

The authors conclude that the Doculus Lumus DL with x15 magnification is an excellent mobile/portable document inspection machine that provides high flexibility and efficient document authentication. This device combines innovative technologies and various light sources to accurately recognize signs of forgery in fully forged documents and detect manipulations in partial forgeries that are not allowed in original/authentic documents. Doculus Lumus can be connected and used with various additional software – USB, Bluetooth and Internet connections, thus facilitating integration with other document inspection systems (Doculus Lumus, 2024).

However, despite the various advantages, document verification equipment also has its limitations, such as battery life, the need for high-quality, professional training, and sensitivity to various environmental factors. The need for high-quality and professional training in Lumus can be explained by ensuring the full use of the document inspection equipment. This factor will improve accuracy efficiency and reduce errors. Taking into account the innovative development trends of various technologies, it is important to continuously improve both the equipment's functionality and the effectiveness of user training, which will be able to ensure the prevention of illegal documents and strengthen national and border security.

Fig. 2. Mobile Document Inspection Equipment Doculus Lumus DL 15x (Doculus Lumus, 2024)

Nowadays, when the forgery of various types of documents (from birth certificates to identity documents) is becoming more and more popular, the need for efficient and proven devices to verify the authenticity of documents is very important. One such solution is the Video Spectral Comparator Regula 4305 DMH. This stationary document inspection machine is designed for in-depth document inspection in the second line. This device offers the advantages of modern technology and ensures high accuracy and reliability of results.

The Video Spectral Comparator Regula 4305 DMH is a stationary inspection device used in second-line checks for in-depth document authenticity verification, as well as capturing images of various security elements, which are later reviewed by document experts. The Regula 4305 DMH features a set of white, IR, and UV light sources of different wavelengths. It is equipped with modules for MRZ, RFID chip, hidden image (IPI), and 1D and 2D barcode reading. For additional visual inspections, the device includes supplementary equipment such as a torch and the modified 10x magnifier Regula 1003M with two white light sources (Regula, 2024).

The control buttons and screen on the front panel allow operation even when the device is not connected to a computer. The video spectral comparator is controlled using the Regula Forensic Studio software, which can capture, process, and save images of inspected objects (Regula, 2024). The device is also equipped with a camera capable of providing high-resolution images, allowing for a detailed examination of documents (Regula, 2024).

Stationary Document Inspection Equipment Video Spectral Comparator Regula 4305 DMH is considered an excellent technological solution, but it may face future challenges. In order to ensure accurate document inspection, the document inspection equipment needs an appropriate environment - adequate lighting and a stable power source. Adverse conditions may affect work performance and the document review process. Regular software updates are required, which can cause additional problems. In order to ensure compliance of the equipment with the latest standards and necessary work functions, the software of the equipment must be updated in a timely manner. If the software is not regularly updated, it leads to the existence of insufficient information and a poor quality document review procedure.

Document checking equipment requires regular maintenance and repair in order to make full use of the equipment. If the maintenance of the equipment is not available, or if it is not carried out in a timely manner, this

can lead to a decrease in the working capacity of the document inspection equipment, as well as to quality results of performance of functions.

The authors conclude that, taking into account all the aspects presented above, the Video Spectral Comparator Regula 4305 DMH is an effective and high-quality document processing device for in-depth document inspection. The advantages of modern technology are offered in the form of this device. However, its performance depends on several factors - environmental conditions, timely maintenance and the need for software updates. In order to fully use this document checking equipment and to ensure high-quality document checking, it is important to continuously improve both the security software and also carry out high-quality training for the users of the equipment. Therefore, the Video Spectral Comparator Regulation 4305 DMH will maintain its relevance in modern document inspection procedures, effectively recognizing the sign of forgery and ensuring the quality inspection of documents.

Fig.3. Document Reader REGULA 70X4.111 (Regula, 2024)

During the document check, it is very important to identify and detect forged documents, this is one of the most important tasks of the border guard. Especially, taking into account the influx of illegal migration into the country and the activity of organized crime. Falsification of documents is a criminal offense punishable by imprisonment.

As new and new technologies develop, it becomes possible to use higher quality and more powerful document inspection equipment at border control points. The study analyzes the procedures for document inspection in the first and second line, simpler document inspection equipment is used in the first line, and more powerful and professional in the second line. Verification of the authenticity of the documents is very important to prevent any illegal activities with the documents. Technical equipment, such as stationary and mobile/portable, helps to detect and prevent the entry of forged documents into the country.

Effective action against the use of forged documents requires the use of high-quality, professional equipment, quality training for officers and

close cooperation between different authorities. The study analysed the problems faced by officers in the performance of their duties, as well as the problems associated with the use of technical equipment in the first and second line of detection of forged documents. By assessing the different types of technology and equipment, the study examined how they are used in document control, in the detection of forged documents and the problems that can arise in their use.

The first line, where different types of documents are initially checked, uses relatively simple technical equipment, such as equipment with standard light sources: UV light, scanning light, side light. These functions of the equipment help to identify security features and to detect signs of forgery in partially forged and fully forged documents. However, these document inspection machines have limitations in terms of accuracy and resolution, and their performance may be impaired by environmental factors, most often when used outside the premises.

For the second line of document examination, where more detailed examination of documents is required, in-depth document examination equipment and microscopes with different magnifications are used. These devices provide higher resolution and the possibility to examine the document more thoroughly, allowing the detection of signs of forgery. However, these devices also have their drawbacks, such as higher costs, the need for regular maintenance and regular training of staff. Technical problems with the equipment can occur due to various environmental factors.

When descriptions are made of forged or authentic documents, potential problems may arise with the quality of the images at a resolution that would allow document experts to easily determine their authenticity or to detect signs of forgery. The use of technical equipment in border controls to detect forged documents is of great and important importance. Despite the fact that the latest equipment for checking documents has been modernised, there is a real possibility of encountering various problems which may affect the quality of document checks. It is very important to continuously use the most innovative technologies, regularly and timely train the staff, as well as try to find different solutions for solving problems, if they arise, in the document verification process.

Based on the above, the authors put forward the following conclusions and proposals regarding the use of technical equipment in document verification and detection of forged documents at border control points.

Conclusions:
1. Document forgery is becoming increasingly complex, making it necessary for border control personnel to use modern technical tools to ensure effective detection of forgeries.
2. Technological advancements are crucial in the border control process, especially in first and second-line checks, where various devices enable the identification of forged documents with high accuracy.
3. In the first line, simpler devices such as UV light and optical magnification tools are used to help identify signs of forgery.
4. In the second line, a more detailed inspection is carried out using more advanced and specialized equipment, such as video spectral comparators and high-resolution image processing technologies.
5. The human factor and technical skills remain critical despite modern technologies, as effective use of the equipment requires well-trained personnel.
6. Stationary equipment is less suited for handling large flows of people, which can lead to bottlenecks, especially during high-intensity border control periods.
7. Environmental factors, such as temperature fluctuations and humidity, can negatively impact the performance and accuracy of technical equipment.

Suggestions:
1. Continue to develop and modernize technical equipment to handle increasingly complex forgery methods and ensure more accurate document verification.
2. Continue to improve training programs for border guards to enhance the effective use of technical equipment and reduce the possibility of errors.
3. Provide more flexible technical equipment, such as mobile verification devices, suitable for document checks outside of border control points.
4. Implement regular maintenance and updates for technical equipment to ensure its effectiveness and longevity in changing environmental conditions.
5. Promote inter-institutional cooperation in combating document forgery to improve information exchange and share best practices.
6. Review the placement and availability of equipment at border crossing points to ensure smooth handling of passenger flows and avoid bottlenecks.
7. Conduct further research on the impact of environmental factors on technical equipment to enhance device performance in various climatic conditions.

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