ENSURING SECURITY AT A PUBLIC AIRPORT

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The goal of the diploma thesis is to conduct an analysis on the current legislation on the public airport security, to specify the technical devices for physical check of persons, luggage and transported material, and to make own judgement about the devices in the field of security quality by means of SWOT analysis. The thesis also outlines new technologies increasing the civil aviation security level.

Key words: airport, safety, security, metal detector, X-ray

1 INTRODUCTION

Air travel now experiences a big boom due to its globality and the need for cooperation of many entities and requires a high professional staff is among the most complex industry. Just for a big boom and steady growth in the share of air transport market, it is necessary to create a joint initiative based on increasing protection and aviation security. The need for more advanced and efficient safety equipment and regulations to improve safety on board aircraft and airports in particular came in 70th years when various militant groups have begun to use aviation as a tool to carry out terror attacks. In aviation we may encounter two terms of safety and security and safety. The concept of security is particularly relevant to the elimination of unlawful acts and the control of persons and goods in order to ensure flight safety. The concept of safety ensures operational safety in aviation. The thesis presents an overview of the three chapters of information regarding legislation on aviation security (safety) as well as the description of the technical equipment used to provide security at public airports (security). The focus of this thesis is the assessment of the technical equipment of the quality aspect of security as well as the description of new technologies to ensure the protection of airports.

2 SECURITY LEGISLATION

Following the tragic incidents of 11 September 2001, it was necessary to establish common safety rules in civil aviation, which were mainly related to entry checks on passengers, baggage and cargo at airports. As a result of these events have increased security measures not only at airports but more attention was paid to ensuring the safety of the aircraft.

2.1 Organizations in aviation safety

The issue of civil aviation and airports dealing with standards and guidelines of international organizations such as:

- The International Civil Aviation Organization ICAO,
- The European Aviation Safety Agency EASA,
- European Strategic Safety Initiative ESSI,
- European Civil Aviation Conference ECAC,
- European Organisation for the Safety of Air Navigation EUROCONTROL.

In the Slovak Republic, the organization, responsibilities and conditions under which it must be ensured protection of airports solved by laws and internal regulations of the Slovak Republic[1].

2.2 The role of the operator in airport security

After joining the European Union, the Slovak Republic has undertaken to comply with the regulation of the European Parliament and the European Aviation Safety Agency, which helps in the development and implementation of safety standards and regulations in the member states. Such regulation includes the development of security program of the airport. Domestic air operator certificate holder, operators of public airports and aviation ground equipment are required to develop an airport security program, and aircraft ground equipment. Security program and its amendments approved by the Aeronautical Authority [1].

3 TECHNICAL EQUIPMENT FOR THE AIRPORT SECURITY

Every day at airports moving large numbers of people, representing potential targets for terrorism and the possibility of other forms of crime. The role of security measures at airports is to avoid any risk or any potentially hazardous situation that might arise at the airport. Implementation, use and improving security measures at airports significantly reduce your chances of getting any dangerous situation at the airport, transfer of illegal items or threat aircraft.

3.1 Ways to protect airport

Protect the airport can be understood as a control activities and services of persons who are tasked to prevent unauthorized access to restricted areas airport security, protect property and material against damage or theft and to prevent the commission of unlawful acts in aviation. Protecting civil airport, aircraft and ground equipment is carried out combining the four methods of protection:

Physical protection

Physical protection is carried out by individuals who directly guard the protected object. The aim of the physical protection of the airport through technical monitoring devices to monitor suspects and prevent them from committing acts of unlawful interference.

Classical mechanical protection

Classical protect airport facilities pose a direct security measures on the territory of the airport, airport premises and facilities. These devices generate mechanical obstacles to bar access to the protected object, to overcome that it will take time, but the tools and skills of intruder. Between mechanical barriers are especially fencing, gates, ramps, structural elements of buildings, locking mechanisms, custody of interest and so on.

Technical protection

To ensure the security of the civilian international airport is used by modern technical security and surveillance equipment and systems that can signal a dangerous situation as a violation of a protected building, fire, equipment failure, etc.. The role of technical protection of the airport is to promote classical mechanical protection and increase the effectiveness of physical protection.

Regime protection

Regime protection at airport consists of administrative and organizational measures that ensure the interests and values airport. This method of protection is formed by a network of international and national laws and regulations concerning the protection of civil aviation against acts of unlawful interference [2].

3.2 Airport perimeter protection

Airport perimeter protection system is tasked with using different means and devices to detect dangerous situations and thus eliminate possible security threats. To protect the airport perimeter is most commonly used three types of systems:

Clipless systems

which are located below ground. These systems detect movement of an intruder through an electromagnetic field that is created around the stored detection cables.

Tracking systems

whose task is to monitor and record the sections suspicious movement. These systems are used to signal distortion protected property interest.

Monitoring systems

that show the detection zone on the screen by camera. Monitoring systems have the task of monitoring public spaces through video or audio recording [2].

3.3 Metal detectors

Metal detectors are among the most widely used security devices at airports. Their task is to detect the presence of undesirable objects that should intend to transfer passengers on board (stabbing, cutting or firearms and other dangerous metal objects. Metal detectors can suit the application for screening divided into:

Shoe metal detectors

Metal detector detects the shoe metal objects hidden in shoes and ankle level up to several cm to him. These detectors are transmitting and receiving coils in the detection of four fields in

the vicinity of shoes. Part of the detector is a control console with traffic lights and audible alarm [3].

Hand-held metal detectors

For a personal tour of travelers used hand held metal detector. This device can be, but also may not be used, because it is only an accessory device to the frame detector. It is used in cases where crossing detector frame was not successful. In this case, the screener is looking for metal objects on the body of the passenger, which are assessed as either satisfactory or unsatisfactory to transfer the aircraft [1].

***Walk-Through Metal Detector* WTMD**

Using a Walk-Through Metal Detector WTMD [1] is carried out basic checks passenger. Through it can locate metal objects that are found on the body of the passenger. When passing a passenger with a metal object detector immediately worker conducting safety checks issued by a visual stimulus with audible buzzer. Consequently, it must undergo a passenger check manual detector.

Table metal detectors

Table metal detectors [3] also called electronic detectors letter bombs or e-mail scanners are used to screen incoming mail, or contain improvised explosive devices. Table detector reveals explosive devices in their standard parts, such as batteries, wires and other metal parts.

3.4 Roentgens

For the screening of baggage, mail and today is already shipping containers and vehicles to use roentgens. Principle of operation is based on X-rays absorption of scattered X-rays in materials of controlled items. On the one hand, the controlled object is a detection portion and the opposite side is a source of X-rays. In most of the x-ray detection transforms incident radiation into electrical signals, which are the electronic processing creates a classic television picture. X-rays according to the size and destination are divided into:

Portable roentgens

Portable roentgens [3] are primarily used pyrotechnics in examining suspicious objects but often they use in their activities and customs officials or police force operational components (detection of bombs, checking baggage and mail, detection of drugs and weapons, border control, etc..).

Chamber roentgens

These devices are mainly used for the detection of improvised explosive devices in sheets or small and medium-sized package, the size of a particular chamber [3]. Unlike portable roentgens source is from X-ray detection part and together with the chamber for controlled object's X-rays in one unit, the keyboard and display part can be separate.

Crawler roentgens

These X-rays are widely exploited, by inspecting luggage at airports, enter the property at customs to check shipments. Very popular are particularly at airports because they can quickly check a large number of baggage. Crawler X-rays in several versions, from small, which are used to control a small hand luggage and small items, to large, which are intended to control the smaller containers [3].

Giant roentgens

Giant roentgens work on the same principle as a band, but the object is a continuous X-ray broaching speed [3]. These devices often used by customs officers and border police at border crossings, airports or ports.

Body scanners

Most discussed type of x-ray in a x-ray to check the person or body scanner. The problem with these devices is showing intimate parts of the human body, but in spite of this problem was the introduction of a number of airports. One of the first airports have begun to use this scanner is Schipol (AMS) in Amsterdam. Time to join him and airports in Europe and on other continents in the world. Most travelers criticizes excessive control in order to preserve their privacy, therefore, the use of personal scanners respect the following rules [3]:

- control performed by a person of the same sex as the controlled person
- the controlled person and worker safety are in separate rooms, the image on the monitor remained anonymous,
- scanned image on the monitor is adjusted to highlight only concealed dangerous objects.

4 ASSESSMENT TECHNICAL EQUIPMENT

Security protection is a set of measures and human and material resources intended to safeguard civil aviation against acts of unlawful interference.

4.1 Assessment of the airport perimeter protection systems

The most appropriate way protection of airport is physical security patrol in combination with an electronic security system and mechanical barrier systems. Electronic security reported disruption to the property at the time the offender is in place, but mechanical security should keep the offender before entering. Generally, the more difficult the entry of an intruder and he is impeded, it will lower its interest.

4.2 Assessment of metal detectors

Shoe metal detectors

Shoe metal detectors on account of their role in ensuring the security of highly efficient. Because they are only designed for a metal detection in shoes is to carry out the entire body controlled people need to use other devices like WTMD possibly trace particle detector.

Hand-held metal detectors

Hand-held metal detectors act as additional screening equipment. The combination of frame detector with trained workers with manual detector significantly improves the efficiency and speed security checks.

Walk-Through Metal Detector

The effect of some WTMD may in certain cases be limited due to interfering signals from the environment (interference), which is now possible to identify and eliminate various technical devices. In combination with other technical security means as a detector or manual means working on a physical principle, have WTMD at airports irreplaceable.

Table metal detectors

For a more thorough safety or security, if necessary, further inspection of suspicious mail is appropriate to use the table alongside metal detectors and small X-ray.

4.3 Assessment of X-ray devices

X-ray devices at airports constitute the basis of technical means, which are mainly used to check baggage, mail and shipping containers. At major airports, however, X-ray devices are also used to control people called body scanners that can display all objects hidden under clothing, regardless of what material they are made. When compared to standard inspection with inspection body scanners, which take complete control of a few tens of seconds, the facts speak clearly for the use of body scanners.

4.4 New technologies for safety assurance

With the increasing number of people traveling by air increasing number of attempted terrorist attacks in aviation. Since technological progress constantly advancing, it is necessary to constantly develop new technologies and equipment, which will enhance the protection of civil aviation like muon shower and detector of explosives Fido XT.

Muon shower

Muon showers nature related to high concentration of protons in substances. Any substance or departs muon and the angle at which the muon track wide can be measured by detectors situated above and below the object. The advantage of muon showers is that it can penetrate through the layer 2 meter lead and produce three-dimensional images, the whole procedure takes less than 1 minute. [4]

5 CONCLUSION

The airport is an important transport and logistics hub, and given the number of people who every day are at airports, represent potential targets for terrorism and the possibility of other forms of crime. It is therefore very important to ensure protection of airports through a variety of technical equipment. This paper provides an overview of international organizations that develop and issue rules and regulations in the field of civil aviation security. These rules are the basis for the implementation of and compliance with aviation security measures. In addition to legislation, the paper addresses those technical devices which are

designed to provide security at the airports and also addresses the novýcm technologies in ensuring airport safety..

BIBLIOGRAPHY

[1] KOLESÁR, Ján.: Ochrana civilného letectva pred činmi protiprávneho zasahovania. Košice, 2010. ISBN 978-80-553-0357-4.

[2] KELEMEN, Miroslav – JEZNÝ, Martin – PULIŠ, Pavel. Letisko – komplex ochrany osôb, majetku a bezpečnostných technológií. Košice, 2010. ISBN 978-80-8040-413-0.

[3] Tallo, A. a kolektiv : Technické systémy a prostriedky polície. Bratislava, 2001. ISBN 80-8054-86-8.

[4] ANDRLE, M: Jak využít mionovou sprchu?. 21 století. 2013, No. 3.

[5] FLIR Systems. Swift, Accurate Exposives Vapor Detection [online]. 2013. Dostupné na internete: <http://gs.flir.com/detection/explosives/fido/fido-features>.

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