

MODERN SCANNING AT AIRPORT AND POSSIBLE EFFECTS ON HUMAN BODY

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The aim of this article is to describe the possible effects on the human body in carrying out security checks at airports and also summed up the latest types of scanning devices, which are necessary for the screening of passengers, but also storage. This article contains the answer to the question body radiation load in summer and its conversion to specific hours flown.

K e y w o r d s. scanning systems, radiation, security, whole-body scanner, scanner shoe scanner liquids

1 INTRODUCTION

Terrorism and violence are inherent in every human society, which evolves and is unfortunately a natural part of human behavior. It is a phenomenon that circumvent or air transport, as evidenced by the famous tragedy in the history of aviation. It is therefore important to avoid these situations in good time. Scanning equipment, but also many others, are used to detect potential hazards triggered by terrorists at airports, in its surroundings, whether on board the aircraft. Scanning devices are now among the most modern and most effective forms mainly detected even the smallest, but the biggest and most dangerous objects able to provoke a terrorist attack with terrifying results.

2 HEALTH CONCERN

Fear for their own security is increasingly required by passengers, employees, but also visitors to the airport, go through security checks, such as scanning and radiography. Such controls, however, must satisfy two conditions: they should be able to detect a wide range of materials and objects and should do so with the lowest possible radiation dose.

The first of the conditions is an essential part of the security system, which is part of each airport. The second condition is directly related to us as passengers, who must be subject to this security check, otherwise we become nonconformists passengers. Some of us are not more aware of the implications of possible radiation exposure. It is therefore necessary to be informed of the results of scanning and

radiography, as well as other effects that occur in the implementation of an integral security check.

There are currently two types of X-ray beam to scan systems for screening of persons:

1 Backscattering system - X-rays do not penetrate deep under the skin of the individual, are able to penetrate the clothing and passenger properly detect unwanted objects. But they are not suitable for detecting dangerous objects in body cavities. A typical scan takes about 8 seconds and leads to effective dose of about 0.03 μSv (microsievert) for individual.

2. Transmission system - thanks to a transmission system X-ray beams can penetrate below the skin surface, through the body of the individual. This system is used to detect undesirable objects in body cavities. Subjects scanning movement of light through approximately 8 seconds and the effective dose is about 0.25 to 2.0 μSv .

2.1 Radiation

Radiation or radiation is the transfer of energy and momentum space. May take the form of particle radiation (the spread of particle space) or wave radiation (spreading wave space). Radiation always carries energy and momentum (ie has a certain direction). When radiation particles have a mass, charge or other properties transferred to them also. We know different types of radiation.

2.2 Radiation load on the body

What is actually safe dose of radiation load on the body? This question is difficult to answer because the radiation affects different in different doses on the human body, depending on how many times a year we fly in what amounts to what a long distance. It should take into account

the fact that the same shall also be subject to cosmic radiation, which on average per year is approximately 0.3 mSv (= millisievert). This value increases with height pribudujúcou and points out that these values are o. i. dependent flown degree latitude but also on solar activity.

Flying personnel flown approximately 40 days per year of around 12 000 km, where radiation is about 52 mSv per year, that is 0.006 mSv per hour Stunde (= 6 µSv / h), it follows:

$$\frac{52 \text{ mSv} \cdot 40 \text{ days}}{1 \text{ year} = 365 \text{ days}} = 5,7 \text{ mSv}$$

This additional dose of radiation is responsible for flying the same number of lung X-ray imaging or CT examination, and therefore hardly means an increased risk for cancer or leukemia. Other injuries, by contrast, must be excluded. An important exception to this are pregnant because the unborn child is particularly sensitive to radiation, especially during the phase-forming organs, and therefore can not completely exclude distortions. All flight lines during pregnancy but your staff normally "territorial", and therefore there exist no grounds for concern.

National Council on Radiation Protection and Measurements (NCRP) was asked to carry out radiation. NCRP take measurements from the American National Standards Institute (ANSI) approved standard for scanning systems using X-rays. NCRP and ANSI recommended that the effective dose per scan should be 0.1 µSv or less.

Exposure during aircraft flight, flight time:

- London-New York, 7.30 h = 37 µSv
- Paris - Washington, 8.00 h = 41 µSv
- London - Rome, 2.30 h = 12.3 µSv

3 TYPES OF SCANNER AT AIRPORTS

Among the most modern and efficient scanners today is called. whole body scanner, which is used in some international airports since 2009. Its introduction was not easy, because there were multiple problems associated with either religion or the fear of nudity and substantial interference with privacy, which provoked much discussion.

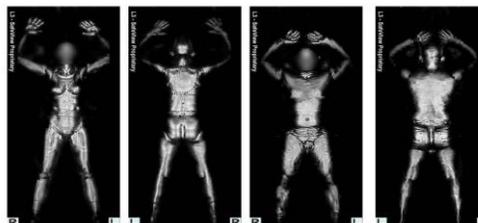


Fig.1. Whole body scanner images

Scanner is among the most modern footwear (SHOESCAN), which began to be used in the Bratislava airport terminals as part of a new security system, which is comparable with some European airports. A similar system using the airport in Paris or in London. While not considering the introduction of controls whole-body scanner, waited for official permission from the EU.



Fig.2. Shoe scanner

Low dose X-ray beam can detect dangerous objects, which may be found in the shoes of passengers, simply attach the device to the leg. Allowing nevyzúvať passengers, but smoothly and continuously pursue the process of tripping. It can scan the organic but also inorganic materials.



Fig.3. Image Scanner shoes

Radiation scanning per capita is less than 0.05 μSv . Radiation to which a person is exposed in a single test is not significant compared with natural radiation. Such verification is considered harmless and allows you to perform an unlimited number of examinations within one year. What concerns about going and employees who serve such a scanner, radiation, taken in the workplace does not exceed the natural radiation levels, suggesting that neither this device need to worry about.



Fig.4. Procedure for passing shoe scanner

Another modern scanner that will shortly be used to Bratislava airport scanner will be liquid, which can detect up to five seconds of containing liquids in a sealed bottle. Can review any type of bottle, even a thermos or baby bottles. If the green light flashes, the liquid is fine, if red, with a bottle of your aircraft to stay put. After his installation would be able to passengers boarding with his water bottle, which is currently prohibited.



Fig.5. Scanner fluids

4 CONCLUSION

Despite possible misgivings, legal actions and opinions that radiation acts as a multiplier of cancer, that radiation supports pre-existing disease, this form is not absolutely necessary and most

effective protection against unlawful acts at several airports.

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