INFLUENCE OF LANDSCAPE RELIEF ON AIR TRAFFIC SAFETY

Lucia Kónyová – Peter Koščák

Landscape is an important factor that can limit and mainly affect not only the overall air transport, as well as its security. The issue of this work is just the effect of this factor on aviation safety. When processing the work she performed were used to study materials acquired air faculty. The work contains a general description of the buffer zones and the airport obstacle limitation, describes the use of airspace, the importance of safety. It also describes the impact of various factors on air transport such as obstacles.

K e y w o r d s: protection zones, obstacle, hazard, risk, notification.

1 INTRODUCTION

Security is usually seen in a negative light. Person perceives things that threaten sensitive than those that create a sense of security. In general, any object that acts on whatever your surroundings may mean a hazard. Danger may give rise to adverse events that a person perceives as a threat. Thus, any threat is an event that may lead to a reduction or loss of functional properties of objects, thus damaging or damage occurred. The damage caused in connection with the operation or use of technical means or human activities, in practice, often referred to as an accident. Safety can be defined in different ways. In the environment of security is broadly defined as the property in which there are no unacceptable risks. The level of security is dependent on the particular situation always relative. But the reality is that in real environments, in spite of all introducing measures can not completely exclude the presence of risk. This means that there is absolute security in such an environment, which does not occur no gambling. That is why the identification and assessment of risks for the possibility of managing one of the most important activities in the field of safety management. The priority principle is to minimize the risk as it is possible, but the manner in terms of effort and funds.

2 CHARACTERISTICS OF PROTECTION ZONES AND OBSTACLE LIMITATION AIRPORT

Aviation safety at airports and reliable operation of air ground facilities, as well as creating conditions for their further development provide protection zones.

Protection zones are an important part of airport takeoff and landing aircraft, because every obstacle can cause an accident, but mainly jeopardize aviation. Protection zones for the airport determined by the Authority, stating in regulation L 14 given level structures, which may not exceed. Protection zones are important not only for the airport but also for aviation ground equipment to be used at the airport that the operation was smooth and was respected security.[1]

The airspace around airports to be kept clear of obstructions to ensure the safe operation of aircraft at airports and to avoid the creation of barriers, which leads to the airport would become unusable for aircraft operations is achieved by setting the obstacle limitation surfaces and planes.[1]

Protection zones to draft the operator or aircraft ground equipment determine the decision of the Authority in consultation with the building authority competent to issue land-use decisions. Determination of protection zones is provided to permit the operation of a public airport or aviation ground equipment.

Aviation Authority in the decision on the designation of protection zones prohibit or restrict the protection zones particular place structures or equipment, planted vegetation or let them rise above the specified level and carry out activities that may affect the safety of operation.

Types of protection zones, their shapes and sizes as well as details of prohibitions and restrictions laid down by generally binding legal regulation issued by the Ministry.

Regulation L 14 protection zone air ground facilities divides the protection zone around the airport closer, wider surroundings of airports, security devices and ornithological protection zones.[1]

2.1 Obstacle limitation surfaces

On the definition of airspace around airports to be kept clear of obstructions system serves obstacle limitation surfaces and planes that define the limit of the maximum amounts that can achieve certain objects. This system also ensures the safe operation of aircraft at airports and avoids the creation of barriers, which leads to the airport would become unusable for aircraft operations.

We know the obstacle limitation surfaces:

- *The outer horizontal plane,*
- *Internal horizontal plane,*
- *Approach plane,*
- *inner approach surface,*
- *The plane missed landing,*
- *Plain climb after take-off.[2]*

3 LOCATION AND ORIENTATION OF THE AIRPORT RUNWAY SYSTEM

Construction of a new airport or expansion of an existing large-scale investment and construction work. In order not to unnecessarily expended funds necessary

overall concept of airport design for as long as possible. Must be considered maximum potential for development in the proposed airport site and so the limits of the final expansion of critical airport facilities.[3]

Assessment issues outside the airport, its performance in relation to the requirements of the regulations and the safety of flight operations, must be considered also questions the airport and its surroundings. The impact of the airport to environment and communities. The chosen location for the airport and runway orientation system must allow long-term development of the airport at the lowest financial cost and social impacts.[3]

Choosing a suitable location for the airport location must begin the assessment of the airport in its present location. It is considered promising market of passengers, speed limits its growth and market growth resulting from the demographic development. One of the key considerations in planning airport is therefore forecast growth in passenger numbers and cargo volumes in the catchments area of the airport.[3]

4 AIRSPACE AND OBJECTS ON AIRPORTS IN THE U.S.

To understand airspace structures and their impact on airports in the U.S. exists provides a comprehensive and understandable source of information and advice regarding the variety of rules, regulations, design, standards and policies associated with the protection of airspace, evaluation of proposed objects on and near airports and their effects on navigable airspace. Failure to protect an airport's navigable airspace can lead to critical degradations of the airport's safety, efficiency, utility and air service capability.

One of the goals of this guidebook is to provide the reader with a better understanding of the FAA airspace analysis process known as „Obstruction Evaluation/Airport Airspace Analysis" (OE/AAA) and the levels of airspace protection it offers and does not offer for airports.

The research conducted for this Guidebook was performed through the Airport Cooperative Research Program (ACRP). This program was designed to address issues of direct concern to airport management and other groups with interest in the U.S. National Airspace System (NAS).[4]

4.1 Object, obstruction, obstacle and hazard

An object is any element of natural growth, terrain, or man-made structure whose height is greater than 3 inches. There are countless objects on and around airports, ranging from lights, to signs, buildings, cranes, hilltops, trees, flagpoles, electric power transmission poles, smokestacks, and towers.

An **obstruction to air navigation** is defined as any object that, upon evaluation, is determined by the FAA to be required to be properly marked, lighted, and identified on aeronautical publications so that it may be easily recognized by aircraft navigating through the airspace.

An **obstacle** is defined as any object that does or would penetrate an OCS, or other specific clearance requirements, for a specific flight procedure.

A **hazard to air navigation** is defined as an obstruction or other adverse object that FAA aeronautical study concludes would have a "substantial adverse effect" to a "significant volume of aeronautical operations.[4]

5 ANALYSIS OF THE IMPACT OF THE RELIEF OF THE COUNTRY FOR THE SAFETY OF AIR TRANSPORT IN SLOVAKIA

The main requirement is for aviation safety. One of the means to achieve it is standardization in the case of airport ground equipment and standardization of procedures. If the parameters do not vary substantially aircraft is no different characteristics or different types of airports.[3]

The European Aviation Safety Agency (EASA) is the centerpiece of the European Union Strategy for Aviation Safety. Its mission is to promote the highest common safety and environmental standards in civil aviation.[5]

5.1 European Organisation for the Safety of Air Navigation

The mission of the European Organisation for the Safety of Air Navigation (EUROCONTROL) is to achieve safety, security, orderliness, speed and economical air transport that do not adversely impact on the environment. There was created for the harmonization of air navigation services in Europe to establish a permanent system of air traffic management (ATM - Air Traffic Management) for civilian and military purposes.[9]

5.2 AIP - Aeronautical Information Manual SR

AIP is mainly designed to meet international requirements for the exchange of aeronautical information. It is the basic document and source of information on air barriers for aeronautical information services.

AIP is published in three volumes. The guide consists of three parts:

- *General (GEN),*
- *Tracks (ENR) and*
- *Aerodromes (AD).[7]*

5.3. Aeronautical Information Service

The role of Aeronautical Information Services - ICAO Annex 15 is to ensure the flow of information or

data necessary for the safety, regularity and efficiency of air navigation.[12]

Airports Council International (ACI) is a worldwide association of airports. It is a non-profit organization whose primary mission is to protect the interests of airports around the world and to promote professional management and airport operations.[8]

5.4 Procedures for air navigation services

Prescription L - 4444 is a binding norm control of the Ministry to the Authority, air traffic service providers, aircraft operators, airport operators, crews of civil aircraft, other organizations, institutions and individuals involved in the planning, implementation and provision of air traffic.[6]

5.5 Use of airspace by Law no. 143/1998 of the Civil Aviation

The law provides for civil aviation, the operations of civil aircraft in the airspace of the Republic of Slovakia, competence and certification of aviation personnel of aircraft and other aeronautical products, the register of aircraft, installation and operation of airports and aviation ground equipment, implementation of air transport, aerial work and other businesses in civil aviation, civil aviation, the competence of state administration and the imposition of sanctions.[11]

5.6 Procedures for Operational Services - Flight Procedures

Prescription L 8168 is a binding norm control of the Ministry for all organizations, authorities, aircraft operators, aircraft crew and aviation personnel who are involved in the preparation, implementation and assurance of flights over the territory of other states where similar procedures State over whose territory the aircraft flies, not otherwise stated.[10]

6 CONCLUSION

"Security" is an element of transport that requires constant attention, refinement and improvement. Its use at airports around the world, there to ensure the safety of a safety management system serves as airport operators and air carriers and navigational resort. There included responsibilities, different procedures, processes and measures to implementation security methods. Affected by many factors on aviation security, whether human error or weather hazards. Every obstacle, object, building, hill and various other elements that may affect the safety of air transport must be marked or lighted in accordance with current regulations and standards. The obstacles that are located near airports and may interfere with aviation or cause an accident are buffer zones and obstacle limitation surfaces.

BIBLIOGRAPHY

[1] KÓNYOVÁ, Lucia. Ochranné pásma letísk., TU v Košiciach, LF, 2011

[2] Predpis L14 Letiská (I. Zväzok) – Navrhovanie a prevádzka letísk, 2008. LIS. Bratislava, 2008, ISBN: 80-968747-2-1

[3] Kazda, Antonín: Letiská design a prevádzka. Žilina 1995. 377 s. ISBN: 80-7100-240-2.

[4] TRB – Transporatation research board of the national academies, ACRP – Airport Cooperative Research Program. [2012-09-21] Dostupné na internete: <http://www.trb.org/ACRP/ACRP.aspx>

[5] EASA – European Aviation Safety Agency; Európska agentúra pre bezpečnosť letectva. [2013-03-25] Dostupné na internete: <https://easa.europa.eu/language/sk/more-about-EASA.php>

[6] Predpis L 4444 Postupy leteckých navigačných služieb, 2010. ISBN 978-80-89297-23-8

[7] AIP – Aeronautical information publication; Letecká informačná príručka SR; [2013-03-25] Aktualizované [2013-01-10] Dostupné na internete: <http://aim.lps.sk/eAIP/eAIP_SR>

[8] ACI – Airport Council International; Medzinárodná rada letísk; [2013-03-25] Aktualizované [2012-08-22] Dostupné na internete: <http://sk.wikipedia.org/wiki/Medzin%C3%A1rodn%C3%A1_rada_let%C3%ADsk>

[9] EUROCONTROL – European Organization for the safety air navigation; Európska organizácia pre bezpečnosť letovej prevádzky; Zápočtová práca [2013-03-25] Aktualizované [2009-01-25] Dostupné na internete: <http://www.zadania-seminarky.sk/rocnikova-praca/europska-organizacia-pre-bezpecnost-letovej-prevadzky/16957>

[10] Predpis L 8168 Postupy na vykonávanie letov, 1997. [2013-03-25] Dostupné na internete: <http://www.fabryatc.net/Civilne_predpisy.html >

[11] Zákon č. 143/1998 Z.Z. zo dňa 7. Apríla 1998 o civilnom letectve (letecký zákon) a o zmene a doplnení niektorých zákonov

[12] Predpis L 15 Letecká informačná služba, 2011. [2013-04-08] Dostupné na internete: <http://web.tuke.sk/lf-klp/Vagner%20Juraj/LP%20I/L%2015.pdf>

AUTHORS´ ADDRESSES

Lucia Kónyová, Ing. Department of Air Traffic Management Faculty of Aeronautics Technical university of Košice, Rampová 7, 041 01 Košice. Lusssiana88@gmail.com

Peter Koščák, Ing. PhD. Department of Aviation Engineering Faculty of Aeronautics Technical university of Košice, Rampová 7, 041 01 Košice. peter.koscak@tuke.sk