ЭКОНОМИЧЕСКИЕ НАУКИ

ANALYSIS OF CONCRETE AND ASPHALT AIRPORT MOVEMENT AREAS FOR THE NEEDS OF REGIONAL AIRPORTS OF THE VISEGRAD FOUR COUNTRIES

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ABSTRACT

Aviation is currently the fastest growing sector of transport not only passengers but also goods. It is considered to be the most efficient, but also the safest, which is why great emphasis is placed on the efficiency and safety of air transport. A particularly important factor in air safety is the condition of operating areas at airports. Operating areas must meet the standards for the category of aircraft that will use them, while being properly maintained to maintain their safety. From a long-term perspective, the service life and costs associated with the operation of airport operating areas are also important. The aim of the article is to analyze the concrete and asphalt airport pavement surfaces of the regional airports of the Visegrad Four countries.

Key words: comparison, airport pavement surfaces, concrete construction, asphalt construction.

INTRODUCTION

Airport movement areas serve to ensure smooth, fast, economical and especially safe air traffic by ensuring the load-bearing capacity and correct surface properties of the road. The paved surface parts of the airport's moving surfaces are the airport paths. The aerodrome operating area is the part of the ground aerodrome intended for take - off, landing and taxiing of aircraft, with the exception of the apron. The main task of the airport path is to guarantee a smooth take-off and a safe landing. Airport paths can be divided into:

- **Runways –** are the areas used for take-off or landing of aircraft at the airport. The number and directions of runways at an aerodrome should be such that the operational usability of the aerodrome for the aircraft for which the aerodrome is intended is not less than 95%. The location and orientation of aerodrome runways should, as far as possible, be such that arrival and departure runways minimize adverse effects on approved and noise-sensitive areas, in order to prevent future noise problems.
- **Taxiways -** enable safe, fast and smooth rolling of aircraft. They are used for the movement of aeronautical and security technology, techniques of maintenance and control of airfields, electronic and radio navigation equipment of the airport. They provide the shortest and most convenient connection of the runway with the aprons and technical facilities of the airport.
- **Aprons** - are defined, usually paved areas at the airport, intended for the placement of aircraft when boarding or unboarding passengers, or when loading and unloading luggage, goods and mail, refueling aircraft and when parking or ground handling aircraft. [1][2]

The choice of the design of airport movement areas depends on several factors, for example: climatic conditions, geological conditions, number of movements per year, or the availability and price of suppliers, materials and labor. The conditions for the construction of airport roads within the Visegrad Four are almost identical, therefore the analysis of airport roads in these countries may expose the preferred type of construction. [3][4][5][6]

METHODOLOGY

The aim of the article is to analyze cement concrete and asphalt airport pavements of the regional airports of the Visegrad Four countries. In order to fulfill the aim of the article, it is necessary to get acquainted with the researched issues. The principal sources of information were book publications that deal with the issue under examination. For the purposes of writing the article the following research methods were used: secondary research, analysis and comparison.

RESULTS

The Visegrad Four is a community of four Central European states: Slovakia, the Czech Republic, Poland and Hungary. States cooperate in several areas of common interest. Based on the current documents from the Aeronautical Information Publications of the Visegrad Four countries, information on the characteristics of airport pathways was obtained and the following graph was compiled.

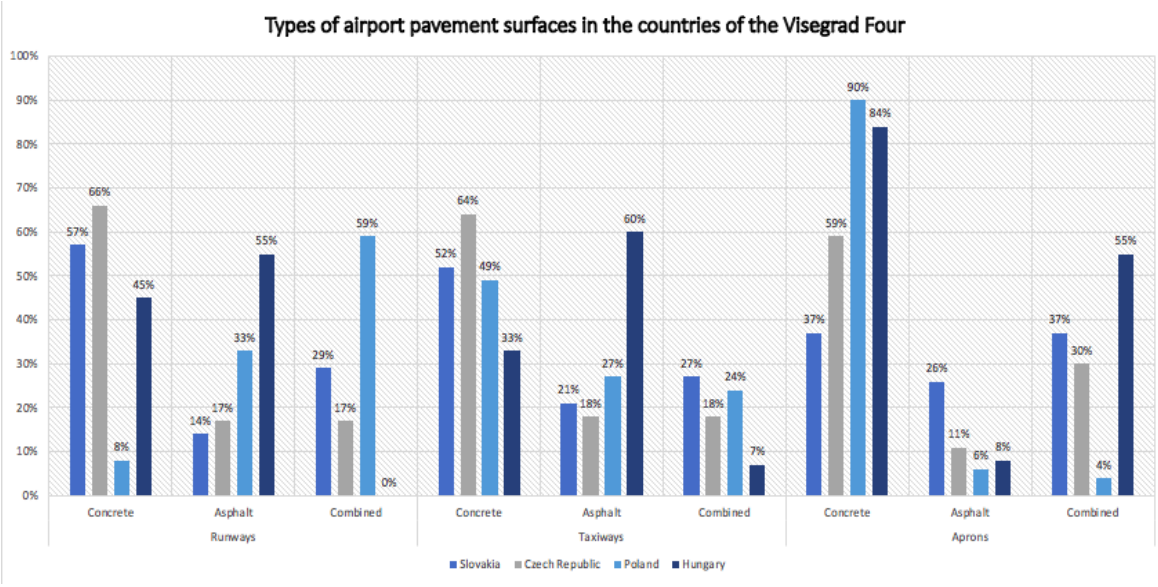

Figure 1. Types of airport pavement surfaces in the countries of the Visegrad Four

Slovakia has six managed airports: Košice, Bratislava, Žilina, Piešťany, Poprad-Tatry and Sliač. At the airports there are a total of: 7 runways, 29 taxiways and 8 aprons. Concrete construction significantly predominates in runways and taxiways. Asphalt pavements are represented on the smallest amount of all types of pavement surfaces.

There are 10 managed airports in the Czech Republic. Together they include: 12 runways, 50 taxiways and 46 aprons. The asphalt type of pavement is found in airports in the lowest rate. Concrete pavements predominate.

There are 25 controlled airports in Poland. At the airports, there are a total of: 27 runways, 303 taxiways and 122 aprons. Runways occur in the largest number of as a combined, in the smallest number they are of a asphalt pavement. Concrete pavements are significantly predominant in taxiways and aprons.

There are a total of 8 controlled airports in Hungary. There are a total of 9 runways, 15 taxiways and 13 aprons. Runways as well as taxiways are dominated by asphalt. Combined runways do not occur at all. The check-in areas are mostly concrete pavements.

In the case of the Visegrad Four countries, which are all located in the temperate climate zone, it can be said in general that the surface of the airport road most often used is of concrete character. The only exceptions are runways in Poland, which are mostly combined, and runways and taxiways in Hungary, which are usually of asphalt pavement.

CONCLUSIONS

Based on the analysis of concrete and asphalt airport movement areas of the regional airports of the Visegrad Four countries, it was found that the concrete surface of the airport road is most often used. The reason may be that, from the point of view of road construction costs, concrete construction clearly dominates as an advantageous one. Its price for the construction of 1 m² is almost 17% lower and also from the point of view of construction it is less fragmented and simpler.

REFERENCES

1. ICAO: Doc 9157, Aerodrome Design Manual, Part 3 Pavements, 2006, Third Edition

2. KAZDA, A. 1995. Letiská design a prevádzka. 1. vyd. Edičné stredisko VŠDS v Žiline, 1995, 377 s. ISBN 80-7100-240-2.

3. AIP SR, Letecká informačná príručka Slovenskej republiky, Letecké informačné služby Slovenskej republiky, 2019. [online]. Available on the internet: <https://aim.lps.sk/web/?fn=1&lng=sk&fn=1&lng=sk>

4. Aeronautical Information Publication, Czech Republic, Air Navigation Services of the C.R., 2019. [online]. Available on the internet: <http://lis.rlp.cz/ais_data/www_main_control/frm_en_aip.htm>

5. Aeronautical Information Publication, Poland, Polish Air Navigation Services Agency, 2019. [online]. Available on the internet:

< https://ais.pansa.pl/mil/aip.html>

6. Aeronautical Information Publication, Hungary, HungaroCrontrol, 2019. [online]. Available on the internet:

< https://ais-en.hungarocontrol.hu/contact-us>