NOISE COMPARISON NEAR THE AIRPORT WITH ROAD TRAFFIC NOISE IN AN URBAN AREA AND WAYS OF ITS ELIMINATION

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The issue of noise is very hot topic in aviation and road transport. Traffic noise is an important risk factor that significantly affects quality of life and health. Excessive noise exposure are mainly residents of larger cities. The work is to analyze and compare the results of noise measurements in different areas around the airport from the SR M. R. Stefanik in Bratislava and various road sections I. class neighborhood in larger cities. After analyzing all the data from measurements of the work shows a comparison of measurement results from different areas of the intensity of traffic on individual sections.

K e y w o r d s: noise, air transport, road transport, noise maps, agglomeration

1 INTRODUCTION

Noise from road and air transport, causing mental and physical stress, and different people react to him. However, even seemingly "accustomed to" the noise will not protect anyone from harm. In residential areas in larger cities and near airports, therefore, measure and evaluate the average noise levels during day and night. The optimum value during the day would be 35 dB, but measurements show that the border crossing. The aim of this work is to: summarize the sources of noise and air traffic, noise measurement to analyze, compare results and to take measures to reduce noise.

2 NOISE AS HARMFUL PHENOMENA TRANSPORT

Noise is any unwanted, harmful noise, which causes an unpleasant, irritating sensation, or a detrimental effect. When assessing the noise is most often deal with noise, which is spread by air. Very serious consequences to the noise generated by traffic, which affects the quality of life in residential agglomerations.

The most widespread, and today najrušivejším noise in residential agglomerations is traffic noise. Noise in the daylight hours in major cities has dramatically continuous nature of the phenomenon of 'no. rush hour.

Noise levels have continued to rise, reaching levels of noise, traffic and air transport.

Road traffic noise is caused by energy source, ie engine to support the roll of wheels and aerodynamically. Accessed by another interval occurring noise. The structure and density of traffic and population density are important factors affecting the noise level. The resulting noise also depends on other technical parameters of the vehicle, road conditions and driving style.[1]

Air traffic noise is perceived as dominant and the primary activities of the outward manifestation of the airport. Generally it can accept the principle that noise from air traffic has a direct harmful effect on human health. It has a disruptive effect, however, annoyed and raises different feelings. Indirect effects on health are allowed repeated disturbances of sleep.[2] Airport noise is characterized by variability and irregularity. The rate of noise and the noise burden on individuals depends on several factors such as method of performing the work, type of aircraft equipment, frequency of aircraft movements and also the method of protection against noise. The rate of noise in the place at any moment depends on the distance and direction of the aircraft, the type of engine. [3]

3 NOISE MAPS

EU Member States should required to prepare by June 2007 strategic noise maps, which improve the situation of their territory for all agglomerations with more than 250 000 inhabitants, all major roads, with more than 6 million vehicles per year and the main railway lines, the which passes more than 60 000 trains per year for airports and the number of takeoffs and landings more than 50 000 per year. The purpose of noise mapping is an analysis of exposure to people different levels of noise load, informing

people about this strain, the establishment of harmonized indicators for alignment of noise maps in EU countries.

The main objective of the strategic noise maps show the noise situation around the obvious sources of noise such as traffic and determine exceedances of action levels. When creating noise maps used mathematical models and the output is the estimated number of dwellings and people exposed to excessive noise. [4]

3.1 Occupational exposure limits for noise in the outer environment

Accessible values of variables determining the environmental noise are shown in the Table 1 for the category of areas, reference intervals and noise sources.

Tab. 1 An acceptable noise levels outdoors

Category areas	Description of the protected area or the outside	Ref. time. inter.	Limits (dB)				
			Traffic noise				Noise from other sources $L_{Aeq,D}$
			Land and water transport $L_{Aeq,D}$	Railways $L_{Aeq,D}$	Aviation $L_{Aeq,D}$	Aviation $L_{Amax,D}$	
I.	Area with special protection against noise, eg. spa resorts, spa and wellness facilities	day evening night	45 45 40	45 45 40	50 50 40	- - 60	45 45 40
II.	Residential space in front mesh room flats and houses, the space before the windows protected room school buildings, health facilities and other protected objects, recreational area	day evening night	50 50 45	50 50 45	55 55 45	- - 65	50 50 45
III.	in a category II area around dataline, roads I. and II. class, communication with local public transport, railway tracks and airports, urban centers	day evening night	60 60 55	60 60 55	60 60 55	- - 75	55 55 45
IV.	Residential area without features and without outside protected areas, production areas, industrial parks, factory area	day evening night	70 70 70	70 70 70	70 70 70	- - 80	70 70 70

The assessed value for a category II area may exceed the available values for determining quantities of road noise from land transport specified in Table 1 more than 5 dB and for category III and IV areas up to 10 dB.

If procedures for flight departures and arrivals with reliable flight path by specifying a specific regulation, may make the stipulated territory the competent authority on health accessible to exceed the noise by 5 dB for the category of zone II and zone III of the categories.[5]

3.2 The strategic noise maps of agglomerations Bratislava

Agglomeration includes densely populated areas, but also places with a minimum population density. Penetrates into 8 districts, includes 34 municipalities, respectively. districts in 52 cadastral areas. Bratislava agglomeration area is 853.15 km^2 .

Agglomeration boundaries were determined in the general binding regulation no. 9/2005. It is a vast area of rugged Senca to Devin and from the Čunovo Malacky as shown in Figure 1.

Figure1 A strategic noise map Bratislava agglomeration [4]

3.2.1 The results of the noise load in Bratislava agglomeration

In the greater is the number of dwellings, schools and hospitals in an area exposed to noise

specific values of noise indicators, including the number of people who are exposed to noise in the assessment area.

The results are summarized in tables and graphics are also shown [4].

Tab. 2 Number of dwellings, schools and hospitals, which are exposed to noise metric described noise indicators [6]

Range of values L (dB)	Number of dwellings exposed to range of values L_{den}	Number of schools exposed band of values L_{den}	Number of hospitals exposed band of values L_{den}	Number of hospitals exposed band of values L_{night}
50 - 54	6 000	36	10	50
55 - 59	35 500	94	26	40
60 - 64	66 000	123	52	48
65 - 69	58 800	77	39	28
70 - 74	35 700	37	51	8
> 75	20 100	32	27	1

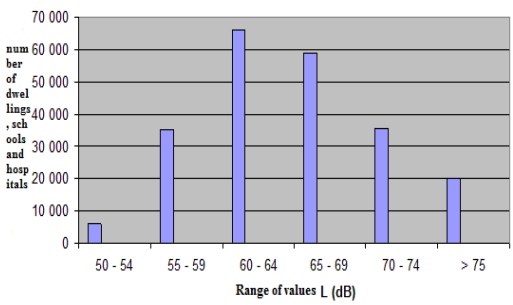

Figure. 2 Number of dwellings, schools and hospitals, which are exposed to noise levels of noise indicators described [6]

Tab. 3 Noise load of rail transport, including trams [4]

Range of values L (dB)	Number of people living in homes exposed to range of values L_{den}	Number of people living in homes exposed to range of values L_{night}	Number of people in the apartments with a quiet façade exposed to the band of values L_{den}
50 - 54	107 900	91 000	12 800
55 - 59	93 300	53 200	14 000
60 - 64	67 600	32 900	14 200
65 - 69	38 500	8 700	10 200
70 - 74	16 600	2 200	6 300
> 75	3 700	400	100

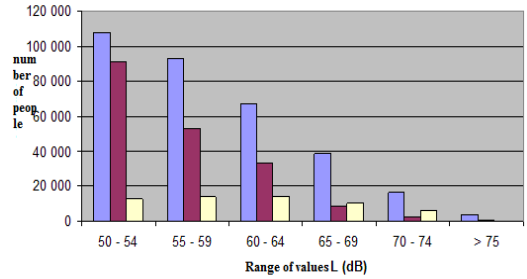

Figure. 3 Noise load of rail transport, including trams [4]

Tab. 4 Noise from air traffic around the airport M. R. Stefanik [4]

Range of values L (dB)	Number of people living in homes exposed to range of values L_{den}	Number of people living in homes exposed to range of values L_{night}
50 - 54	2 500	1 500
55 - 59	1 600	100
60 - 64	500	0
65 - 69	0	0
70 - 74	0	0
> 75	0	0

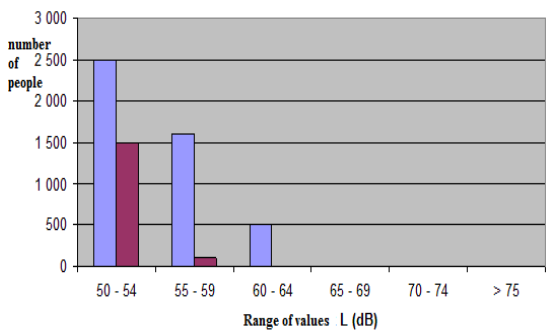

Figure. 4 Noise from air traffic around the airport M. R. Stefanik [4]

The results show that people who live in apartments are generally exposed to noise in rail traffic, including trams from 50 dB to 75 dB and even more than in air. Results of air traffic around the airport M. R. Stefanik show that the specified number of people living in flats, the band exhibited values ranging from 50 to 64 dB.

The results show that housing, schools and hospitals are exposed to noise in the most traffic from 50 dB to 75 dB and even more dB.

3.3 The strategic noise maps around routes I. class

The preparation of strategic noise maps around routes I. classes were selected those road sections I. class, which, according to available information, comply with the condition more than six million crossings per year.

The total length of roads is monitored 237,7 kilometers and total land area for which to make strategic noise map is 284,9 km. Sections are located almost across from Trnava, Slovakia, Košice. Noise maps those road sections were processed by Euroakustik, p. r. a.

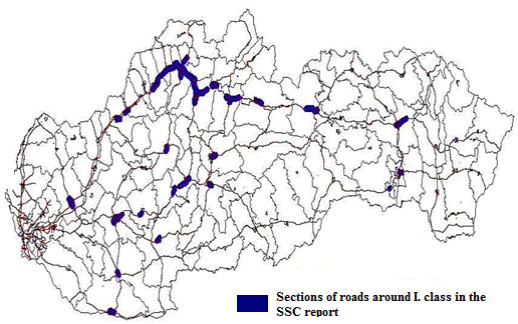

Figure. 5 A strategic noise map those roads I. class [4]

The picture shows that it is the major sections of different lengths, which are sprawling all over Slovakia.

3.3.1 The results of the noise load in the vicinity of roads I. class

The agglomeration around routes I. class is the number of people living outside agglomerations in dwellings and the number of people living in homes with a quiet façade. The number of people in the area under consideration is exposed to noise described by specific values of noise indicators. The results are summarized in tables and graphics are also shown.

Tab. 5 Number of people living outside agglomerations in dwellings. [4]

Range of values L (dB)	Number of people living in homes exposed to range of values L_{den}
55 -59	53 000
60 - 64	41 000
65 - 69	20 900
70 - 74	12 900
> 75	9 800

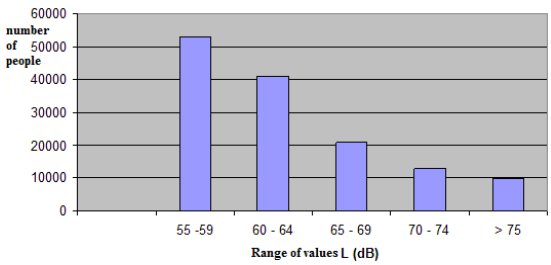

Figure. 6 Number of people living outside agglomerations in dwellings [4]

Tab. 6 Number of people living in apartments with a quiet façade. [4]

Range of values L (dB)	Number of people living in homes with a quiet façade exposed to the band of values L_{den}
55 - 59	5 900
60 - 64	9 200
65 - 69	7 500
70 - 74	7 100
>75	7 400

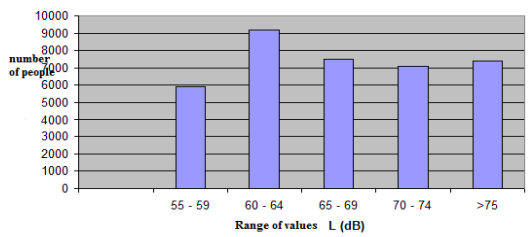

Figure. 7 Number of people living in apartments with a quiet façade. [4]

The results show that people who live in apartments outside agglomerations are exposed to noise from 55 dB to 75 dB and dB more than the people who live in apartments with a quiet façade. [4]

4 ACTION TO LIMIT NOISE

Noise reduction and limitation of aircraft noise around airports are the main objectives of the European air transport policy of the European Union, aims to prevent an overall increase in noise levels around airports. [7]

Limit noise around airports and reducing the impact of the effects of noise on people can be in several ways:

-reducing noise at source
-introduction of modern aircraft
-replacement of older aircraft engines,
-soundproofing aircraft,
-determine the noise standard track,
- a ban on night flights. [8]

Long-term measure limiting noise based on the available targets. Knowledge of technical acoustics should be applied as widely as possible throughout all stages of the proposed activities are likely harm to the environment and human health, the use of indicators and measurable scientifically justified in order to be properly and regularly monitored in all stages of the solution:

- Transport planning,
- technical measures at noise sources,
- reduction of sound transmission - in the design noise control measures to use knowledge and experience of strategic noise maps
- regulatory measures, economic measures or incentives to reduce the noise made according to current technical capabilities, knowledge and proven experience in practice. [4]

5 CONCLUSION

The current situation of road and air transport is necessary to observe all precautionary protective measures to limit and reduce the harmful adverse effects of noise from road and air transport on the environment. A precondition for this task is the regular noise monitoring and evaluation of results, which is related to the modernization of technical equipment for monitoring, as well as using optimal methods of processing of noise studies.

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