THE PROBLEM COMMUNAL NOISE IN CITY OF VRANJE

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Abstract: Noise is any unwanted sound. This means that every sound effects (buzzing, noise, magnifier, speech and so on.), which interferes with work or rest, is noise.

Communal noise generated by all noise sources that are found in the human environment, excluding the noise that occurs at the workplace in the industrial plants. It mainly comes from traffic and it's called traffic noise.

Department of Public Health Vranje is authorized and accredited professional organization that performs measurements of noise pollution in the city of Vranje. Measurement of noise in both cycles included ten measuring points that are found in a residential area. The level of acoustical load at each measurement point is followed by three measurements in the daily interval and two measurements in a night interval. Made the daytime, evening and nighttime measurements at 53 measuring points (a total of 159 measurements) over a period of 15 minutes of noise. From the 53 measuring points are higher noise level at measuring point 51 (almost all measuring points) and ranges from 2 to 47.2 dB (tab. 1 Measuring points of noise pollution Vranje-2015-day / evening / night).

The way to combat environmental noise largely depends on the degree of development, economy, culture and politics. There is no estimate on the world level about the impact of noise on the environment and human health as well as estimates of the price of that impact. The existence of a modern harmonized with European regulations normative acts will be aimed at the maximum limit and control the exposure of the population of acoustic pollution.

Keywords: *noise, communal noise, acoustic pollution, protection measures.*

1. INTRODUCTION

The noise is, especially in recent decades, one of the main causes of complex health damage, especially in large, densely populated cities.

The noise which surrounding the modern city residents has increased over the last 30 years by 50% or more, so it represents an accompanying phenomenon of modern life, especially in urban and industrial, but more and more in terms of the rural environment. The city's noise is a chaotic sum of sounds (from many sources) that differ among themselves according to duration, amount and intensity, and therefore hear differently.

Normal human ear can not hear all the sounds that occur in nature. Audibility of sounds that exist in nature is limited in relation to the pitch, or sound frequency. It ranges from 16 to 16 000 Hz. The ear is most sensitive to the sound of 1 000 to 7 000 Hz and a maximum sensitivity is about 4 500 Hz. The upper limit of the sensitivity of different people is different in older people it is down to 6000 Hz.

How man old becomes less sensitive to higher frequency sounds. The sounds of frequencies below 16 Hz which human ear can not hear belong to the area called infrasound.

Sounds frequencies above 16 000 Hz which human ear also can not hear, and that may even have a very destructive mechanical effect and used in the technique, belong to the area called ultrasound.

Noise is divided by the color, strength and height of sound. The unit for measuring the volume sound called bel (B). In practice, however, it takes ten times smaller unit - decibel (dB).

It is usually taken that the permissible limit noise to 65 dB. Noise should not exceed this volume, since there may be detrimental to human health. The noise of 130 dB, respectively deafening noise, is taken as the limit of tolerance.

Mean values of noise levels in urban areas vary within the limits of:

- Major cities - 65 to 75dB,
- Medium cities - 63 to 73dB,
- Small towns - 62 to 71dB,
- Rural settlements - 45 to 62dB.

In addition to roads with very heavy traffic noise level in the range of 75 to 80 dB. The largest cause of traffic noise, and other sources such as industry, restaurants, street noise and noise of various origins in households, are represented to a lesser extent.

Communal noise is defined as noise from all sources of noise that are found in the human environment, excluding the noise that occurs at the workplace in the industrial plants.

Based on these findings the sources of noise pollution can be divided into:

1) Noise sources outdoors (all forms of transport, machinery for public works, industry, machinery and vehicles for urban maintenance, sports, concerts, amusement parks, alarms, etc.).

2) Sources of noise indoors (home appliances, air ducts and air conditioners, stereos, home entertainment appliances, etc.).

The most significant source of noise pollution of the environment is certainly the traffic in all forms. In addition to the noise created by the means of transport in the environment, means of transport is characteristic and noise inside the vehicle where they are exposed to drivers and passengers. The levels of noise in the community are not high enough to lead to hearing damage, or cause a number of adverse effects. On the noise are particularly sensitive children under the age of 16 years and persons older than 65 years.

Noise is one of the stressful factors that affect the health of psychosomatic disorders, because via the nervous system affects the heart, blood vessels, blood pressure, digestive tract and many other organs and tissues which causes changes and functional disturbances. Many of the negative effects of noise can cause chronic diseases caused by stress (insomnia, high blood pressure, appetite disturbance and sexual dysfunction, anxiety and depression).

2. MATERIAL AND METHODS

Department of Public Health Vranje is authorized and accredited professional organization that performs measurements of noise pollution in the city of Vranje in accordance with the Regulations on noise measurement methods, content and scope the report on noise measurement ("Official Gazette of RS", No.72 / 2010) and with the Decree on noise indicators, limit values, methods for assessing noise indicators, harassment and adverse of effects of environmental noise ("Official Gazette of RS", no.75 / 2010).

Control of noise levels in urban environments requires continuous monitoring of the state of the noise level in order to identify the most vulnerable parts of the city, estimating the number of vulnerable people and the possibility of reducing the level of acoustic loads in the environment.

The main objective of this program monitoring noise levels is to provide data on the values of the indicators of day and night noise at the measuring points with the busiest traffic in residential areas.

Measurement of noise in both cycles included tens of measuring points which are located in a residential zone. The level of acoustical load at each measurement point is followed by three measurements in the daily interval and two measurements in a night interval.

The first cycle of measurements was performed from 08.05.2015. to 18.05.2015. The second annual cycle of day and night measurements were carried out between from 24.10.2015. to 11.18.2015.

The measurements were performed at a distance of six to eight meters away from the axis of the intersections of those streets and at a height instrument of 1.5 meter. A total is executed of 100 measurements at specific locations (tab. 1).

3. RESULTS WITH DISCUSSIONS

The measurements were carried out at the measuring points that are selected as representatives of certain urban areas of the City of Vranje, for different purposes and along the busiest roads. The aim of the measurements is to obtain as complete acoustic image of the city, for further planning of roads, residential, industrial, recreational and business areas, with the aim of protecting human health. Table 1 can be seen different volume during the year measured at 53 measuring points which are classified by purpose space where they are located.

Table 1. Measuring point the levels of communal noise pollution -Vranje-2015-day / evening / night

Serial number	Location	Use of the space	Limit value in dB		Measured level dB		
			To us already	For night	Day	More	Night
1.	City park	Area for relaxation and recreation, Hospital and rehabilitation zones, cultural and historical sites, parks	50	40	53.7	55.5	54.0
2.	Park at the Teacher Training Faculty	Area for relaxation and recreation, Hospital and rehabilitation zones, cultural and historical sites, parks	50	40	47.2	53.3	53.4
3.	Park „M3 4 Juli"	Area for relaxation and recreation, Hospital and rehabilitation zones, cultural and historical sites, parks	50	40	52.6	52.7	44.8
4.	Sports Center	Area for relaxation and recreation, Hospital and rehabilitation zones, cultural and historical sites, parks	50	40	54.0	62.3	58.6
5.	Health Center - Vranje	Area for relaxation and recreation, Hospital and rehabilitation zones, cultural and historical sites, parks	50	40	53.2	62.3	62.3

6.	Pulmonary dispensaries	Area for relaxation and recreation, Hospital and rehabilitation zones, cultural and historical sites, parks	50	40	47.2	59.7	49.2
7.	Special Hospital Vranje	Area for relaxation and recreation, Hospital and rehabilitation zones, cultural and historical sites, parks	50	40	50.7	51.4	44.5
8.	Roundabout Vranjska Banja	Tourist areas, camps, school zone	50	45	57.2	58.6	49.1
9.	Pharmacy Vranjska Banja	Clean residential areas	55	45	50.1	52.7	49.4
10	Elementary school ,,Predrag Devedžić" Vranjska Banja	Tourist areas, camps, school zone	50	45	54.6	49.7	49.4
11.	Elementary school ,,Branko Radičević" Vranje	Tourist areas, camps, school zone	50	45	54.6	61.4	48.6
12.	Elementary school ,,Radoje Domanović "Vranje	Tourist areas, camps, school zone	50	45	73.4	62.3	49.6
13.	Elementary school ,,Svetozar Marković" Vranje	Tourist areas, camps, school zone	50	45	53.3	63.2	51.8
14	Elementary school ,,Vuk Karadžić" Vranje	Tourist areas, camps, school zone	50	45	59.9	63.1	92.2
15.	Elementary school ,,Dositej Obradović" Vranje	Tourist areas, camps, school zone	50	45	59.5	60.3	70.3
16.	Elementary school ,, J. J. Dragon"Vranje	Tourist areas, camps, school zone	50	45	58.0	65.1	50.2
17	High school ,,Bora Stankovic" in Vranje	Tourist areas, camps, school zone	50	45	56.4	53.3	48.4
18	Economic School, Vranje	Tourist areas, camps, school zone	50	45	53.7	58.6	51.4
19.	Medical School, Vranje	Tourist areas, camps, school zone	50	45	54.3	62.3	53.1
20.	Technical School, Vranje	Tourist areas, camps, school zone	50	45	58.8	55.5	59.0
21.	Agricultural School, Vranje	Tourist areas, camps, school zone	50	45	54.6	57.7	66.5
22.	Special schools, Vranje	Tourist areas, camps, school zone	50	45	48.1	59.1	55.5
23.	High School of Applied Professional Studies, Vranje	Tourist areas, camps, school zone	50	45	51.7	62.8	51.2
24.	Preschool institution ,,Neven"	Tourist areas, camps, school zone	50	45	63.1	50.5	51.8

25.	Preschool institution „Brownie"	Tourist areas, camps, school zone	50	45	44.6	60.2	51.4
26.	Preschool institution „Boško Buha"	Tourist areas, camps, school zone	50	45	50.7	54.3	52.4
27.	Preschool institution „Our Child "	Tourist areas, camps, school zone	50	45	62.0	60.1	56.2
28.	Preschool institution „Sun "	Tourist areas, camps, school zone	50	45	53.2	60.8	47.3
29.	Preschool Children's Joy Foundation	Tourist areas, camps, school zone	50	45	53.7	64.4	46.9
30.	House student - internat	Area for relaxation and recreation, Hospital and rehabilitation zones, cultural and historical sites, parks	50	40	55.9	54.4	49.9
31.	Vranjska Banja, left, down the river at kindergarten	Clean residential areas	55	45	59.2	59.4	52.5
32.	Vranjska Banja, right down to the river at kindergarten	Clean residential areas	55	45	58.1	57.8	45.3
33.	Intersection Cetinjska-V.Smajevića	Clean residential areas	55	45	67.2	66.4	54.2
34.	The third local community-building retirement	Clean residential areas	55	45	46.9	61.8	65.7
35.	Intersection B.Parovića-A.Mladenovića	Clean residential areas	55	45	52.2	59.8	47.7
36.	The resort Viktor Bubnja	Clean residential areas	55	45	51.6	59.8	52.8
37.	Ivo Andric-Mostar	Clean residential areas	55	45	64.5	63.8	57.7
38.	Vranjska Banja-across the river in a small bridge	Clean residential areas	55	45	63.1	62.9	55.4
39.	Square of Brotherhood and Unity	City center, craft, trade zone with flats, along the highway, highways and urban roads	65	55	65.6	54.7	54.6
40.	Street P. War brigade ambulance	City center, craft, trade zone with flats, along the highway, highways and urban roads	65	55	65.2	61.2	62.7
41.	Intersection Partizanski put-school	City center, craft, trade zone with flats, along the highway, highways and urban roads	65	55	65.2	55.2	62.7
42.	V.Maslеše-Vojvođanska	Clean residential areas	55	45	68.1	52.7	57.2
43.	Bledska - EuroPetrol	City center, craft, trade zone with flats, along the highway, highways and urban roads	65	55	65.1	55.2	62.7

44.	Paris Commune-M.Pijade-Idea	Clean residential areas	55	45	60.5	53.9	56.7
45.	Church Yard „Holy Trinity"	City center, craft, trade zone with flats, along the highway, highways and urban roads	65	55	50.7	51.7	55.9
46.	This boulevard-Marko Kraljevic	Clean residential areas	55	45	65.7	63.1	64.5
47.	Kajmakchalanska-G.Charshija	Clean residential areas	55	45	55.2	65.3	65.6
48.	Haџi Prodanova	Clean residential areas	55	45	65.4	60.2	65.6
49.	Building L.Brene - AIK banka	City center, craft, trade zone with flats, along the highway, highways and urban roads	65	55	60.5	61.3	54.2
50.	Belgrade	City center, craft, trade zone with flats, along the highway, highways and urban roads	65	55	72.5	64.2	67.1
51.	Terrace above the BID zone	City center, craft, trade zone with flats, along the highway, highways and urban roads	65	55	59.4	62.3	53.9
52.	Brankova Street-L.Ribara	City center, craft, trade zone with flats, along the highway, highways and urban roads	65	55	68.6	64.2	62.8
53.	The resort Palestine	Clean residential areas	55	45	44.6	62.3	62.4

The measured values show that almost all the settlements have increased noise levels, often exceeding the permitted maximum. The biggest overruns is in during the summer, exceeding the maximum value in the other seasons are more evenly distributed in almost all areas. In the area of leisure and recreation is the most vulnerable area around the metering point "Health Center Vranje - because all mean values above permitted levels. This can be explained by the geographical position of the location, which is located in the city center, with many roads that pass through it. In the school zone is increased noise in the spring and autumn months, which may be linked to the increased presence of children. The administrative area is the most vulnerable area around the measuring station in the Belgrade Street, which also constitutes the most important and most vital part of the transport network in Vranje.

4. CONCLUSION

Daily measurements were done, as well as evening and nighttime measurements at 53 measuring points (a total of 159 measurements) over a period of 15 minutes of noise. 53 measuring points are higher noise level at measuring point 51 (almost all measuring points) and ranges from 2 to 47.2 dB (Table 1. Measuring point the levels of communal noise pollution - Vranje-2015-day / evening / night)

At the measuring point of elementary school "Vuk Karadzic" measured noise level at night is 92.2 dB (allowed noise level is 45 dB), which indicates that 47.2 dB above the permitted level.

At the measuring point of elementary school "Dositej Obradović" measured noise level at night is 70.3 dB (allowed noise level is 45 dB), which indicates that 25.3 dB above the permitted level.

At the measuring point Medical center measured the noise level at night is 62.3 dB (allowed noise level is 40 dB), which indicates that 22.3 dB above the permitted level. At the measuring point Sports center measured the noise level at night is 58.6 dB (allowed noise level is 40 dB), which indicates that 18.6 dB above the permitted level.

At measuring points city park and park near Teacher's Faculty measured noise level at night is about 54 dB (allowed noise level is 40 dB), which indicates that the 14 dB above the permitted level. In the other measuring points was recorded a slight increase in noise levels.

Protection measures that can be implemented in the City of Vranje, it is divided into two groups, short and long term.

Short-term protection measures would include:

1. Speed limit movement of vehicles (especially in housing zones);

2. Prohibition of transport for certain categories in the center of town and directing them towards less sensitive areas to noise;

3. Better regulation of traffic (it is necessary to provide such a control traffic at intersections who do not slow down the movement of the vehicle and does not lead to traffic jams, as must unload area in downtown city, Beogradska Street);

4. Requires the favorable selection of public-urban transport;

5. Improving the road surface and sanctioning traffic participants.

Long-term measures of protection against noise would include:

1. Proper planning use area;

2. The inclusion of measures of protection against noise at the design stage of buildings;

3. The construction of vertical protective walls and horticultural arrangement of protective belt along the road traffic routes.

It is estimated that it will continue in the summer months, in the evening and night time, noise levels will be increased from the electro-acoustic noise from the restaurants and the noise and babble of young people around these buildings in the central parts of the city, also registered an increase in noise levels on major roads and major intersections.

The way to combat environmental noise largely depends on the degree of development, economy, culture and politics. There is no estimate on the world level about the impact of noise on the environment and human health as well as estimates of the price of that impact. The existence of a modern regulations, harmonized with European regulations normative acts will be aimed at the maximum limit and control the exposure of the population of acoustic pollution.

5. LITERATURE

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