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STUDY ON NOISE LEVEL GENERATED BY HUMAN ACTIVITIES IN SIBIU CITY, ROMANIA

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Abstract

In this paper I have proposed an analysis and monitoring of the noise sources in the open spaces of air traffic, rail and car in Sibiu. From centralizing data obtained from the analysis of the measurements performed with equipment noise levels, we concluded that the noise and vibration produced by means of Transportation (air, road, rail) can affect human health if they exceed limits. Noise is present and part of our lives and always a source of pollution as any of modern man is not conscious.

Key words**:** *air traffic, car traffic, noise level, rail traffic*

INTRODUCTION

The purpose of this study is to determine the impact of noise in Sibiu, air traffic noise, rail and car. Measurements were performed in noise levels inside the Sibiu International Airport on takeoff and landing runways passenger aircraft. Noise levels within the airport can adversely affect comfort and health status of the population in the area of its site. As a result of expansion and modernization works Sibiu International Airport, air traffic held him known changes to increase the number of air flights and increasing transmission capacity aircraft that serve.

We can also say that the noise produced by road traffic in Sibiu have the same environmental impacts as those produced by air traffic ie direct effects on health, eg auditory system disorders, but also indirect effects such as psychophysiological stress, chronic heart disease, sleep disturbance and impact on morbidity and mortality. Car traffic was monitored in several busy intersections in the city of Sibiu.

Rail traffic is 10% of total transport emissions noise in Sibiu. The noise comes from the engines (especially diesel), the friction of the wheels on the rails, and whistle blowing. In addition, when the train is moving at high speed, noise is more important than areoacustic other sources. Depending on the aerodynamic train noise emissions are 50-80 times the logarithm of train speed and become significant at speeds greater than 200 km/hour[1]

Dose-effect and Schultz equation provides a statistical picture of population severely affected by traffic noise from above. This parameter includes seven classes of noise assessment [2,4].

Scientific evidence shows that the discomfort caused by noise from transport sources is different depending on the mode of transport. Usually at an equal level equivalent continuous sound pressure and noise of an airplane is more annoying than road noise, especially at medium to high levels[5]. .

So that we can get an idea of all that is noise pollution caused by human activity in Sibiu, I proposed in this study to monitor noise from outdoor concerts organized by the City of Sibiu, and fireworks in Venue Theatre Festival.

The values obtained in this study come from an average of measurements performed during the hours of monitoring of each event.

MATERIALS AND METHODS

In order to monitor noise sources in spaces open site of Sibiu, I used a Digital level (**Fig.**

1) meter equipment profile GLX-exploration (Fig.2) unit that was attached to sensor measurement noise. To get a more complete picture of the sources and noise from Sibiu, we collected samples from various locations and areas of the city, we performed measurements of noise from road, rail and air. Measurements were inside International Sibiu Aeroport, railway train station and various intersections with heavy car traffic, all from Sibiu. Other events were monitored and outdoor concerts unhold Great Square in Sibiu, fireworks and cultural events at the Festival Theatre.

The device used for measurement noise levels, is fitted Engineering and Environmental Laboratory in Agriculture and I used it at work practical discipline of environmental pollution sources (Table 1). Digital sound level meter is a digital device for measuring the level of sound waves in decibels (dB).

The sound level meter is used for measuring the sound source intensity of 40-130 dB. It is a device for checking the sound sources or simple measurements of ambient noise.

Fig. 2. GLX-explorer

RESULTS AND DISCUSSIONS

The purpose of this study is to determine the impact of noise inside the Sibiu International Airport on takeoff and landing runways passenger aircraft. Noise levels within the airport can adversely affect comfort and health status of the population in the area of its site. As a result of expansion and modernization works Sibiu International Airport, air traffic held him known changes to increase the number of air flights and increasing transmission capacity aircraft that serve (Table 2).

Table 1. Sibiu – Stuttgart BluAir, Aircraft B737 class 300, Race 329, 16.03.2013/time 09:05-09:15

Locatione	Measured values (dB)				Measurement conditions / Sources of noise	Terms Weather
	LEQ	SPL	MIN	MAX		
Sibiu airport runway - distance 5m wing aircraft	70	64,3	75	85,7	Noise	17° C, , partly cloudy, light wind
	84,4	68	88,9	96,2	Off	
	90	69,7	94,1	106	Off	
	91	63,7	95	108	noice	

Table 2. Disturbance index takeoff aircraft

Locatione	Leq measured (dB)	Index disruption R	Appreciation class noise
Sibiu airport runway -at different distances from the aircraft wing	70	4,77	very noisy
	84,4	5,9	traumatic
	90	6,70	very traumatic
	91	6,79	very traumatic

We can say that road traffic noise have the same environmental impacts as those produced by air traffic ie direct effects on health, eg auditory system disorders, but also indirect effects such as psychophysiological stress, chronic heart disease, disorder sleep and impact on morbidity and mortality (Fig. 3, Table 3).

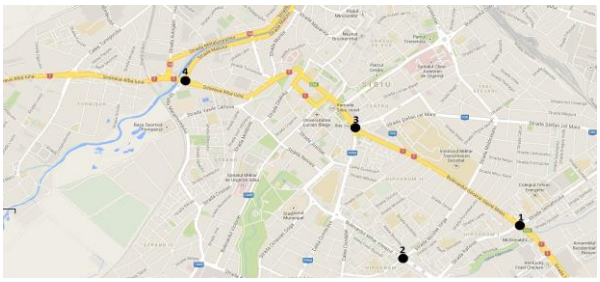

Fig. 3. Map intersections monitored
1-Intersection Semaforului Street with V.Milea Avenue,
2-Intersection M.Viteazu Avenue with N.Iorga Street,
3-Intersection Piata Unirii,
4-Intersection Alba Iulia Street with Malului Street and Maramuresului Street.

Table 3. Noise monitoring in various intersections in Sibiu

Locatione	**Measured values (dB)**		
Intersection Semaforului Streed with V.Milea Av	**Day**		
	LEQ	**1. MIN**	**2. MAX**
	80,2	79,1	89,4
	79,3	76,8	85,3
	70,2	69,5	75,6
Intersection M.Viteazu Av with N.Iorga Streed	**LEQ**	**MIN**	**MAX**
	84,4	77,2	84,1
	90	75,3	81,3
	91	67,3	71,4
Intersection Piata Unirii	**LEQ**	**MIN**	**MAX**
	89,4	79,6	91,3
	85,3	75,5	87,2
	75,6	70	77,2
Intersection Alba Iulia Streed with Malului Streed and Maramuresului Streed	**LEQ**	**MIN**	**MAX**
	85,3	80	92
	83,7	78,6	89,4
	80,7	71	79,2
	Evening		
Intersection Semaforului Streed with V.Milea Av	**LEQ**	**MIN**	**MAX**
	82,1	78,2	85,3
	76,7	75,6	83,7
	79,6	74,8	80,7
Intersection M.Viteazu Av with N.Iorga Streed	**LEQ**	**MIN**	**MAX**
	79	74,3	82,3
	77	72,4	80,5
	75,3	70	76,3
Intersection Piata Unirii	**LEQ**	**MIN**	**MAX**
	74,4	77,2	87,3
	70	75,3	85,3
	66,6	67,3	82,5
	Week-end		
Intersection Semaforului Streed with V.Milea Av	**LEQ**	**MIN**	**MAX**
	78,2	74,4	88,3
	82,4	70	87
	64,8	66,6	78
Intersection M.Viteazu Av with N.Iorga Streed	**LEQ**	**MIN**	**MAX**
	85,3	74,6	85,3
	83,7	71	84,2
	80,7	67,6	75
Intersection Piata Unirii	**LEQ**	**MIN**	**MAX**
	77,2	78,4	89,2
	75,3	74,3	88,1
	67,3	70,2	79,3
Intersection Semaforului Streed with V.Milea Av	**LEQ**	**MIN**	**MAX**
	79,6	79,6	93
	75,5	76,2	90,2
	70	71,1	82,1

Noise Impact largest rail operations are in urban areas, where most functions are performed transshipment. In addition, rail terminals are often located in areas with high density inner cities (Table 4).

A recent study shows that 35% of children aged 7-18 years have loss of hearing ability. This is due, in most cases, musical performances in an orchestra, wearing headphones or participation in noisy concerts.

A big threat is the ear and stereo music stations, whether at home, at a concert or a disco.

Table 4. Noise monitoring of the train station in Sibiu

Pct. determining	**Location**	**Measured values (dB)**			**Measurement conditions / Sources of noise**
		LEQ	**MIN**	**MAX**	
23.04.2014/ora 14:35-14:45					
1.	Mare Station Sibiu	80,7	82	95	Train-Săgeata Albastră
		71,7	69,7	74	Stay train
		93,1	89,3	103,6	train Staff
		76,1	77,4	83,5	Stay train

Dangerous hearing explosions tires are cars or trucks, and fireworks.

So that we can get an idea of all that is noise pollution caused by human activity, I proposed in this study to monitor noise from outdoor concerts organized by the City of Sibiu, and fireworks during the festival International Theatre.

Values obtained in the table below come from an average of measurements performed during monitoring hours of each event (Table 5).

Table 5. Monitoring of other noise sources in urban

Pct. determining	**Location**	**Measured values (dB)**			**Measurement conditions / Sources of noise**
		LEQ	**MIN**	**MAX**	
27.05.2014/ora 21:35-23:45 (concert), **6.06.2014, ora 24:00-24:10** (foc de artificii)					
1.	Sibiu city	101	111,3	118,5	Concert
		98,7	99,4	106	background noise
		115	117,5	119,3	Concert
		93,4	98,3	108	background noise
		97	92	101,1	**fireworks**
		80,1	78,1	98,3	background noise
		95	98	104,9	**fireworks**
		82,5	84,2	96,5	background noise

C**ONCLUSIONS**

As a result of this study, the following conclusions can be drawn:

- Noise from aircraft monitoring was higher during takeoff and lowest during landing. According to measurements made noise levels, Sibiu International Airport runway, values equivalent continuous noise from aircraft landing stood around 90-106 dB (A)

values for the discomfort index R is in the class of appreciation "traumatic and very traumatic. "Under Government legislation 674/2007 on "Evaluation and management of ambient noise" results from measurements are above the limits, so we refer to noise[5, 7].

-The values of noise levels have been taken from Mare in Sibiu Station can compare noise and train train Blue Arrow Personnel 19102. According samples 19102 Personal train noise is greater than the product of Blue Arrow, so it is recommended to train more frequently use Blue Arrow.

-The analysis of data collected and processed in the field can see that traffic is very busy in Sibiu, the number of vehicles is high strength, noise level is above the allowed limit (of measurements was sometimes exceeded 100 dB) less especially during peak hours. Noise highest occurred in intersections monitored day between 7.30 to 8.30 am in the morning, afternoon and in the days between the hours of 15.30 to 17.30 free weekend.

-Other sources of noise pollution were monitored artifice fires and outdoor concerts. The data collected and analyzed, we could see that the values have deposit limits, sometimes skipping threshold 100dB and why we consider such events as noise pollution[6].

To protect the inner ear and auditory system, by monitoring challenging noise sources can make the following recommendations:

• Avoiding consecutive noisy activities.

• Using station stereo music listening at normal limit without becoming annoying. Offering ears a break.

• Protecting your ears with earplugs or headphones when special equipment and powerful machines are operated. Measuring the intensity noise of a band or musical group and protecting ears when they are too high.

By including education classes in the school of information about the dangers posed to the hearing due to noise. If a child has been exposed to loud noise, hearing should be tested immediately.

It is recommended that each family member to have made at least one hearing test. In children it is recommended that this test be done before the start of school. People at risk of losing their hearing test should go to this every year[3]. These include those working in loud noises long term newborns with family history linked to hearing loss, infants and children with ear infections that have lasted more than three months, and anyone over 40 years.

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