

STUDY REGARDING URBAN NOISE DURING THE DAY IN TIMISOARA

STUDIUL PRIVIND ZGOMOTUL URBAN PE TIMP DE ZI DIN MUNICIPIUL TIMISOARA

Adina HORABLAGA, E. PUTNOKY

Environmental Protection Agency Timis, Romania
Corresponding author: Adina HORABLAGA, e-mail: adinahorablag@yahoo.com

Abstract Noise affects population from physical and psychical point of view. If the 40 dB level noise provokes sleeping disorders, a 55 dB level noise creates significant disturbance. At greater levels of 65 dB, noise affects seriously human health, acting in the first place on cardiovascular system and could get to (or aggravate) affections as hypertension, ischemia and others. At levels over 80 dB noise produces progressive and cumulative deterioration of hearing even if is for short time exposure, like minutes. These aspects are underlining impact exposure adjustment importance at noise on population and establishing clear limits for level noise. In general the 50 dB value is considered as being the most adequate maximum limit admitted during day time for equivalently exterior buildings noise level, in urban environment. In this paper we try to emphasize the significant impact of road traffic in the urban noise generation and the fact that urban noise is the only environmental factor that degrades its quality with the passing of time.

Rezumat Zgomotul afectează populația atât din punct de vedere fizic cât și din punct de vedere psihic. Dacă un nivel de zgomot de 40 dB provoacă doar tulburări ale somnului, un nivel de zgomot de 55 dB creează un disconfort semnificativ. La nivele mai mari de 65 dB, zgomotul afectează serios sănătatea umană, acționând în primul rând asupra sistemului cardiovascular și putând duce la (sau agrava) afecțiuni precum hipertensiunea arterială, cardiopatia ischemică și altele. La nivele situate peste 80 dB zgomotul produce deteriorarea progresivă și cumulativă a auzului chiar și în cazul expunerii de scurtă durată, de ordinul minutelor. Aceste aspecte subliniază importanța reducerii impactului expunerii la zgomot asupra populației și stabilirea unor limite clare pentru nivelul de zgomot. În general, se consideră valoarea de 50 dB ca fiind cea mai potrivită limită maximă admisă, pe timp de zi, pentru nivel de zgomot echivalent exterior clădirilor, în mediu urban.

Key words: noise, dB, level noise, people, traffic

Cuvinte cheie: zgomot, dB, nivelul noxelor, oameni, trafic.

INTRODUCTION

According data gave by European Agency of Environment, 120 mil EU people (more than 30 % from population) are exposed at noise levels generated of highway traffic which are beating 55 dB. Main cause of urban noise is highway traffic, and noise is the only environment factor of which quality is worsening as time goes by thanks to the constant growing number of cars which are in traffic.

MATERIAL AND METHOD

Measurements have been done with a sound level meter Bruel & Kjaer MEDIATOR 2238. Integrator Sound level meter of first class precision, with monitoring software (logging). Sound tests sampler interval: 100 ms. Microphone: Bruel & Kjaer of free area. Measurement method: STAS 6161/3-82

Location sound meter: 3m from the frontage exposed to noise of the considered building, at 1,3 m height (on tripod).

Measurement duration: 8h for measurements during the day, 30 min for measurements during the night, 10 min for informative measurements.

RESULTS AND DISCUSSIONS

Multiannual measurements done are indicating road traffic as the main noise source in Timisoara city. Approximate 80% from the main investigated noise sources are caught up to the road traffic development and overtaking of the admitted maximum limit during day time for residential areas is insert in more then 72% from the cases (according to figure 1).

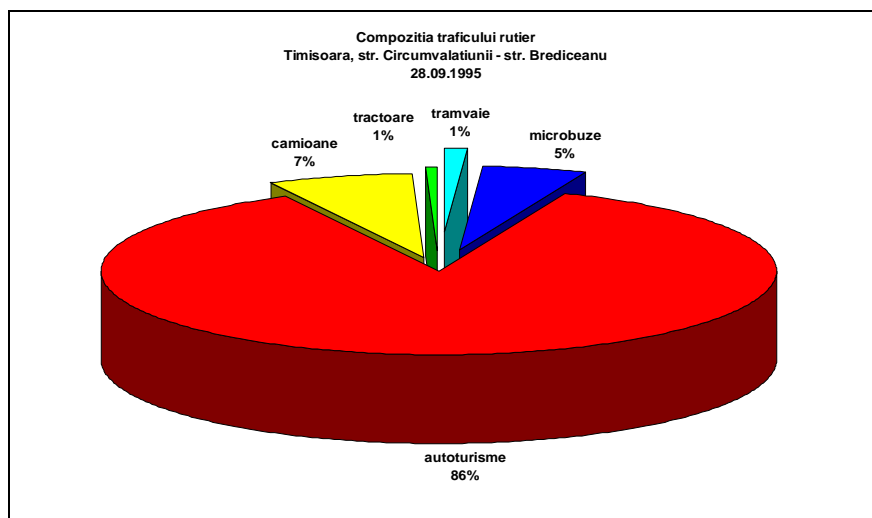


Figure 1. Road traffic composition

Road traffic composition diagram indicates the fact that cars represent the majority of vehicles which are in movement on the streets of Timisoara city. The grown relative percentage of heavy transport is gave by the fact that Timisoara does not have yet a functional highway which permits transit traffic from the city.

Double diagram *equivalent* level noise /traffic density (figure 2) demonstrates direct relation of direct proportionality between motor vehicles number which are in traffic and measured noise level. Noise level is also strongly influenced by the motor vehicles speed, of the traffic control (home signal), of the circulation fluidity and technical condition of cars and roads.

City roads are bisected in four technical categories, majority of big arteries and intersections being of II technical category. Equivalent noise level across these streets (which are register the biggest population density) oscillate around the value of 70 dBA.

Next figures are illustrating noise relative constancy in time, comparative, Arad Way road in 1999 and in 2006 year (figure 3 and 4). Measured values at 7 years interval are demonstrate the fact that noise is the only environment factor which is not improved with time. It can be observed that in none of the measurement, the level of noise doesn't go under 55 dBA value, and the overtaking 75 dBA value is an frequent event.

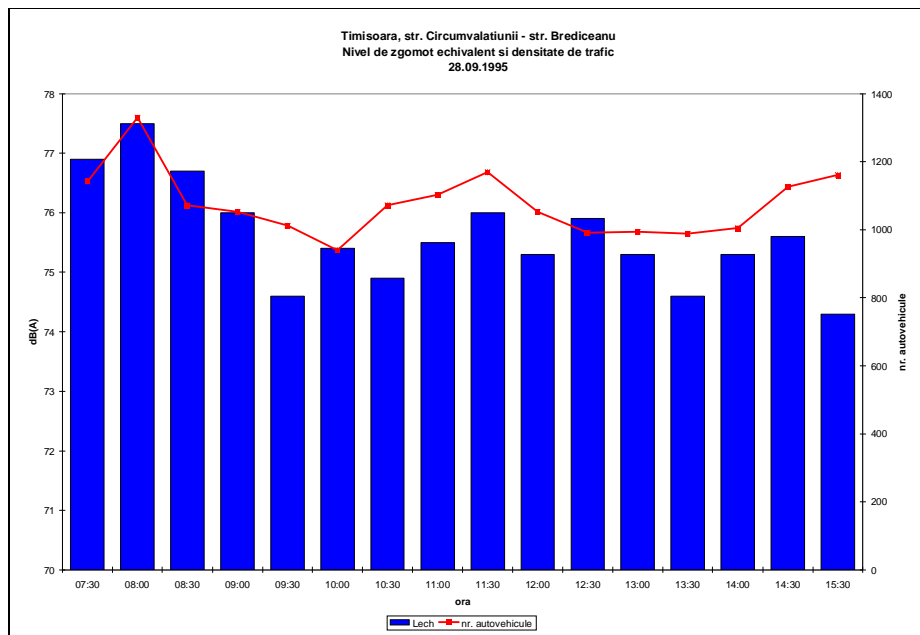


Figure 2. Double diagram equivalent level noise /traffic density

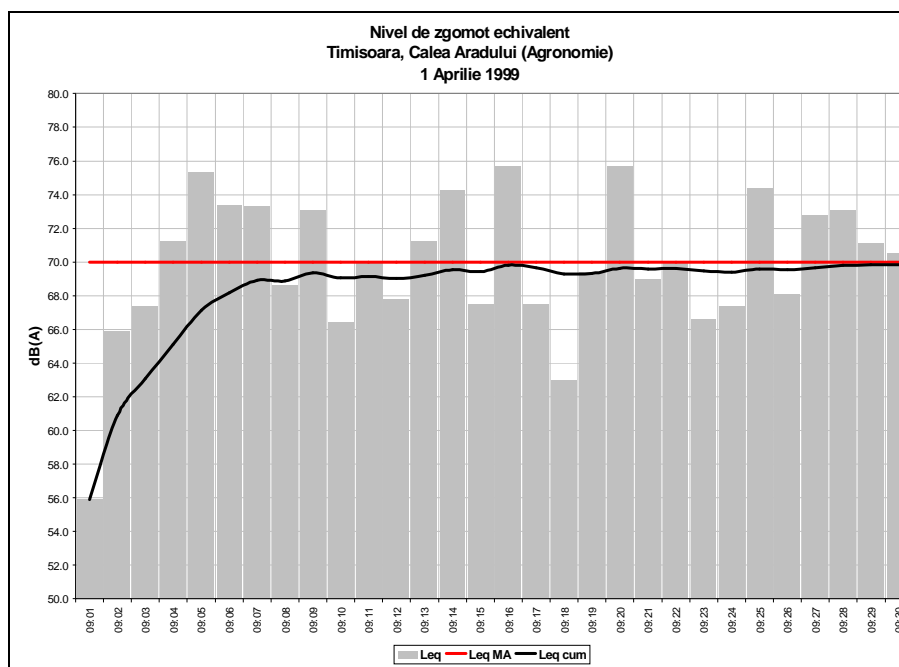


Figure 3. Graphic representation regarding noise constancy in time, comparative, Arad Way in 1999 and 2006 year.

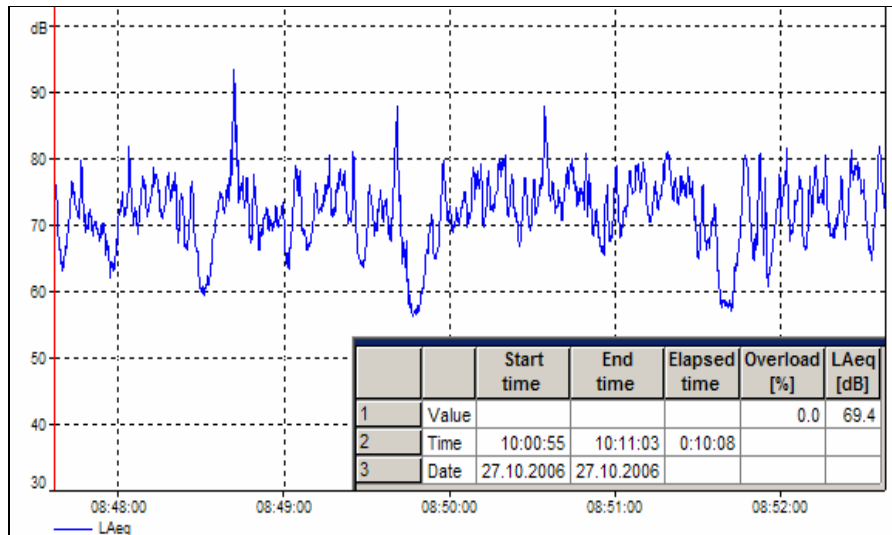


Figure 4. Graphic representation regarding noise constancy in time, comparative, Arad Way in 1999 and 2006 year.

Road noise traffic affects bad the playgrounds which are around greatest road arteries. It is the case of playgrounds from the Heroes boulevard, from Dr. Russel square and Arad Way road (67.1 dBA). The noise does not subtract inside these functional areas at less than 55 dBA. In the case of the playground from Arad Way road (Motul), equivalent noise level did not go under 60 dBA (Figure 5).

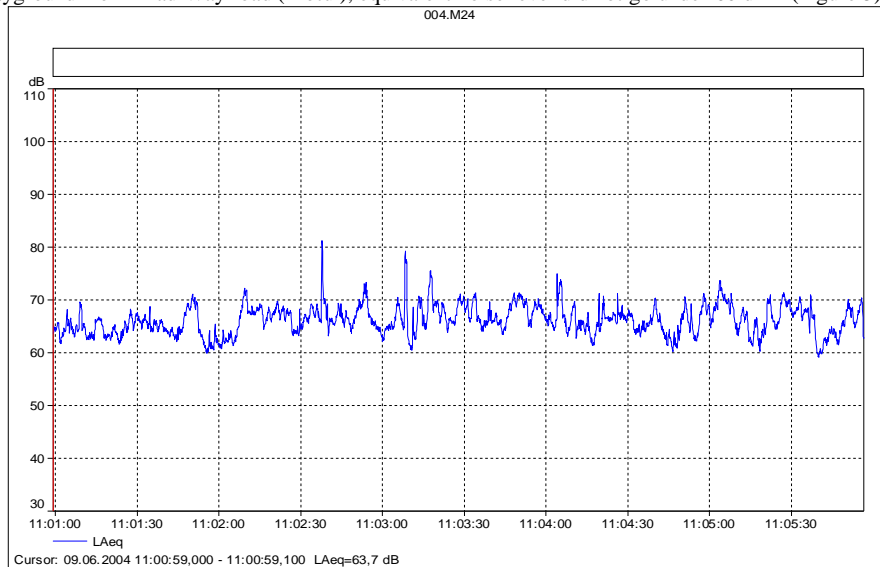


Figure 5. Graphic representation regarding measurements done in Motul area. The Playground zone.

For playgrounds around streets of inferior technical category (III and IV), noise level is a lot reduced, according a diminished flux traffic. Is the case of the playground from Eforie square where it have been measured 53.6 dBA (figure 6).

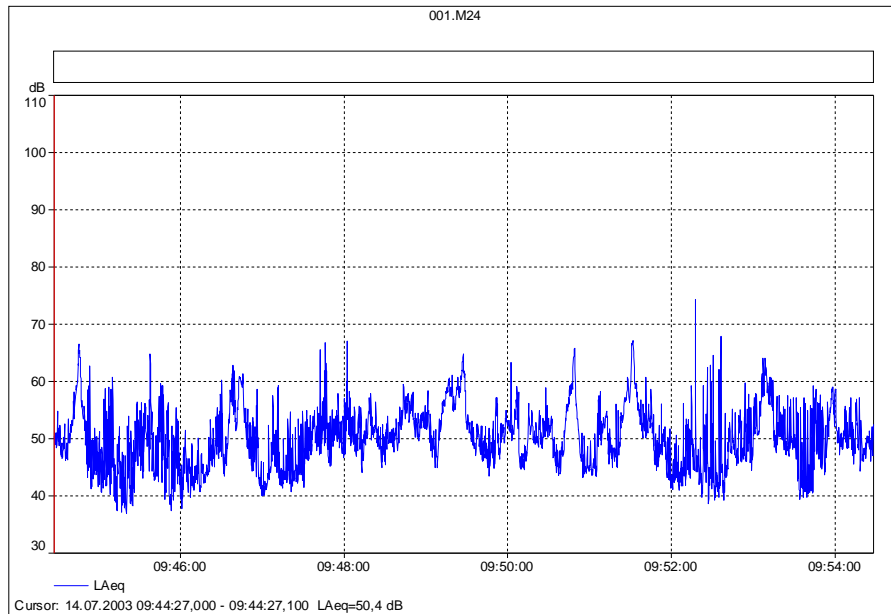


Figure 6. Graphic representation regarding measurements done at Eforie square. The Playground zone

Many of the protected endowment (recovery facilities and of medical treatment) are placed around intensely circulated roads and the consequence is made by the exposure on long term of the sick people at the noise levels which cross the admitted maximum limit significant of 40 dBA established for medical treatment areas.

In the next diagram it was used a spectral level noise representation. Warmer colours are indicating the higher apparition frequency of a certain noise level. Through this representation is easy to observe that in medical treatment placed in the neighbourhood of big streets, the noise does not go under 50 dBA, but it can reach and pass frequent over 90 dBA (figure 7).

The noise generated by the common transport is masked by the normal sound of the road traffic, in the case of the trolley buses and buses. (figure 8).

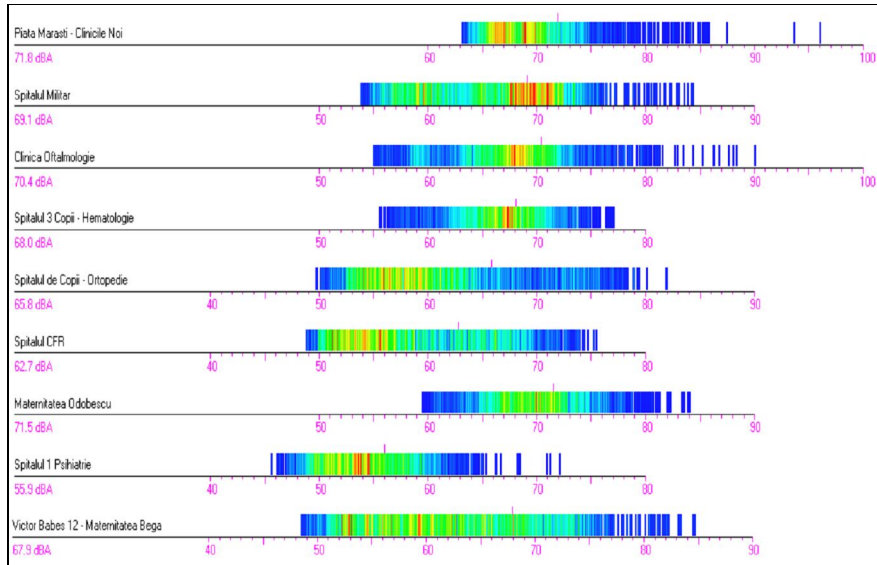


Figure 7. Spectral representation of noise level

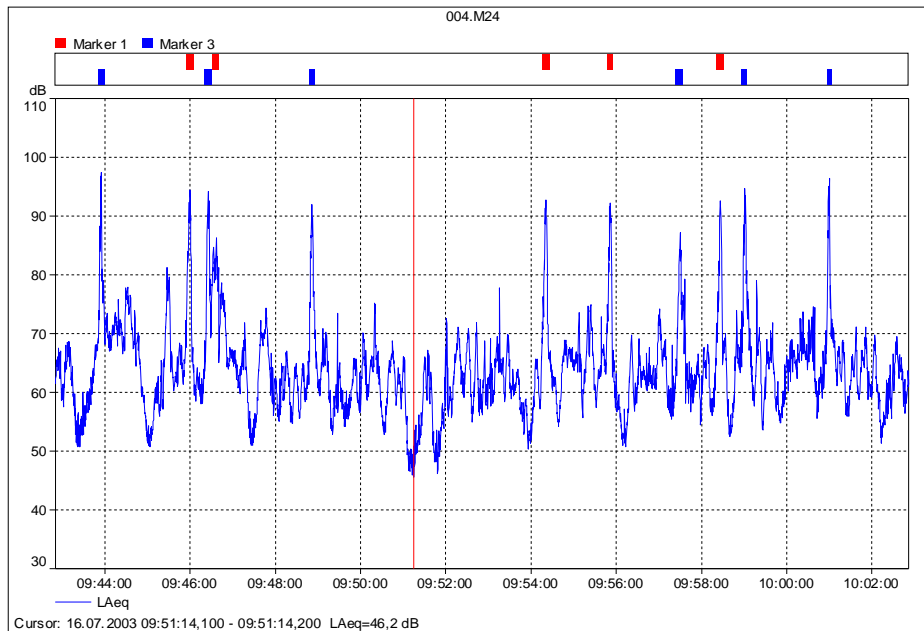


Figure 8. Graphic representation regarding noise generated by the common transport

Trams circulation, especially on certain sections (Kogalniceanu – Traian square,, Gheorghe Doja) contribute at the significant growth of cumulate noise level. Trams passing in both directions (red and blue marker) raises noise levels at values of over 90 dBA, cumulated noise level growing with 5-8 dBA during day and also during night (Figure 8).

CONCLUSIONS

In trams circulation case, noise is generating at the vehicle's level and also at roll way, being usually combined with vibrations. Rehabilitations works of the roll way together with optimization of ways and speed limit measures can reduce equivalent noise level cumulated with till 5 dBA, and top noise level with till 30 dBA, as the case of the section Independency way-Drubeta.

As effective reduction of urban noise level measures, ways rehabilitation , circulation conduct, semaphore optimization, can have a positive influence on the reduction of cumulated noise level.

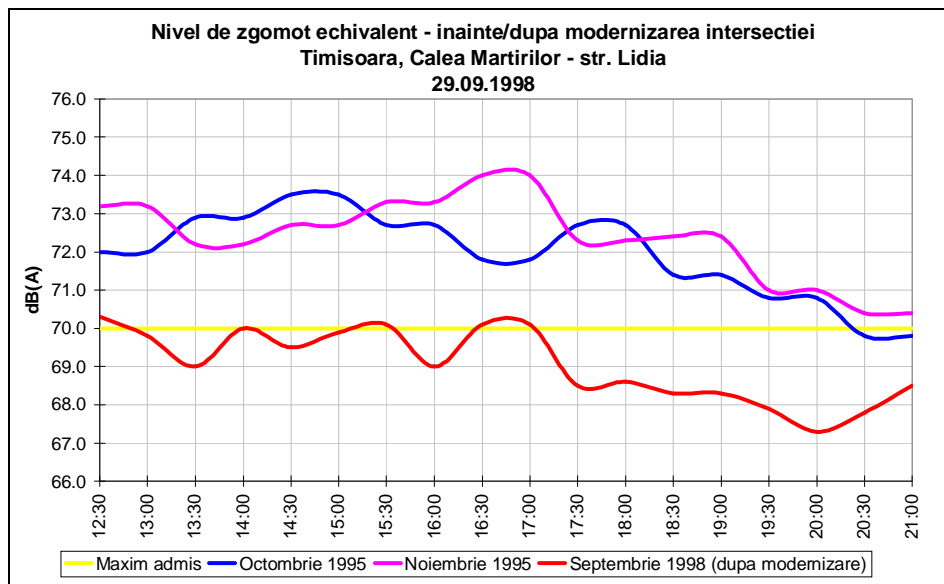


Figure 9. Equivalent noise level before/ after Martyr's way-Lidia street

For example, measurements have indicated a significant decrease of cumulate equivalent noise level (3 dBA) after rehabilitation and semaphore installation of the Martyr's way-Constantin Prezan street.

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