ASSESSMENT OF NOISE QUALITY IN BOLPUR-SANTINIKETAN AREAS (INDIA)

Pratap Kumar Padhy*and Bijaya Kumar Padhi

Centre for Environmental Studies, Institute of Science, Visva-Bharati University
Santiniketan-731 235, West Bengal, (INDIA)

*E-mail : padhypk@gmail.com

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ABSTRACT

Noise is a prominent feature of the environment including noise from transport, industry and neighbours. An important part of noise assessment is the actual measurement of the noise levels. Continuous Leq measurement during day time (0600–2100 hr) was carried out in residential, commercial and silence zone location of Bolpur-Santiniketan areas during June-December, 2005. The results show that the noise pollution in the city is wide spread throughout most of its area. The noise in this area is composite in nature. Public participation, education, traffic management, structural designing play a major role in noise management.

Key Words : Noise pollution, Bolpur-Santiniketan, Traffic management.

INTRODUCTION

The perception of sounds in day-to-day life is of major importance for human well-being. Communication through speech, sounds from playing children, music, natural sounds in parklands, parks and gardens are all examples of sounds essential for satisfaction in everyday life. In the modern world, development in technology, commerce, communication and education has enhanced the urban growth both in developed and developing countries. With global urbanization, there have occurred many environmental problems causing pollution and environmental degradation. Out of many environmental problems, noise has emerged as one of major urban environmental pollution[1,2]. Environmental noise pollution has not been an entirely new phenomenon, but rather has been a problem that has grown steadily worse with time. Noise, defined as 'unwanted sound', is perceived as an environmental stressor and nuisance. Increasing noise exposure is today a serious problem for most cities and, high focus is currently put into monitoring and calculating actual noise exposure levels to understand the size of the actual problem.

Noise is a prominent feature of the environment including noise from transport, industry and neighbors. Transport noise is an increasingly prominent feature of the urban environment, making noise pollution an important environmental public health

* Author for correspondence

issue[2,3]. Noise pollution in urban cities is steadily increasing over the years[4]. Proportion of people exposed to noise is greatly increasing. This has direct and indirect affect to the people that can lead to the health hazard[5]. Some of the major health hazards caused by the noise as suggested by experts are permanent hearing loss, high blood pressure, muscle tension, migraine, headaches, higher cholesterol levels, gastric ulcers, irritability insomnia, increased aggression and psychological disorder[5-7]. In India, there were very few researches on noise pollution being carried out. Even such surveys conducted in the past have revealed that noise levels in urban areas are generally much higher than recommended standards[8-11]. The main purpose of this study is to monitoring and calculating actual noise exposure levels to understand the size of the actual problem and to develop fundamental database to assist in preparation of guideline for the noise pollution prevention and control in this area.

Table 1: Basic characteristics of the noise monitoring sites at Bolpur-Santiniketan areas

Category	Monitoring sites	Characteristics
Silence	Central Library	Institutional area
	Post Office More	Hospital, school and mandir area
	Siksha-Bhavana	Institutional area
	Bolpur High School	Mixed area
Residential	Gurupalli	Human settlement
	Simantapalli	Human settlement
	Ratanpalli	Human settlement
Commercial	Supermarket	Shopping area
	Chaurastha	Shopping area
	Jambani	Shopping area
	Sriniketan Market	Shopping area

MATERIAL AND METHODS

An important part of noise assessment is the actual measurement of the noise levels. The noise equivalent level (Leq) was measured continuously at each monitoring sites **(Table 1)** using sound level meter (model LUTREN, SL-4001). The sound level meter was calibrated before taking the measurement according to the user manual. The 'A' weighted network was used as it corresponds very closely to a person's hearing sensitivity. Continuous Leq measurement during day time (0600–2100 hr) was carried out in residential, commercial and silence zone location of Bolpur-Santiniketan areas during June-December, 2005. The Leq result of each location was statistical analysis and the results are presented in terms of average L_{10}, L_{50} and L_{90} for different areas of the study area.

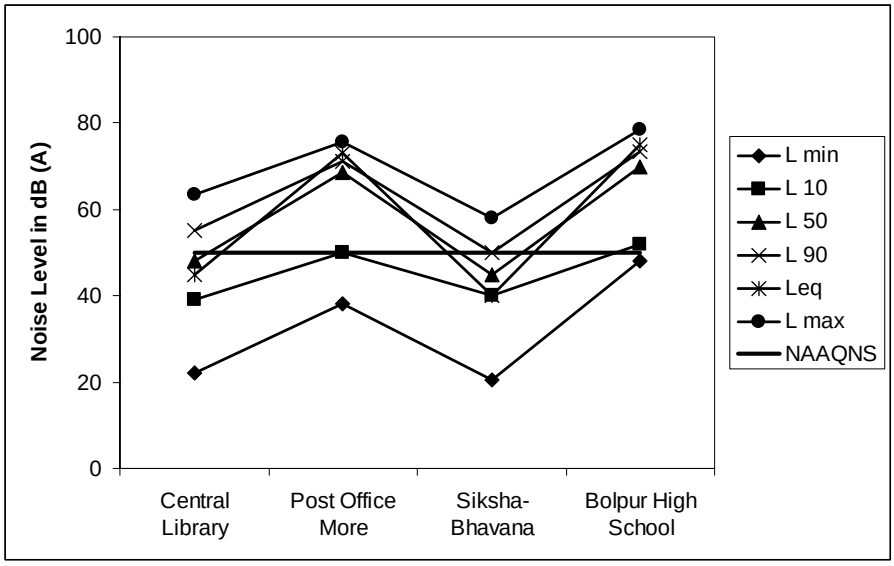

Fig. 1 : Noise levels at silence zone compared with standard at Bolpur-Santiniketan areas during June-December, 2005.

RESULTS AND DISCUSSION

In order to get the impressions of noise pollution resulting from activities undertaken within the Bolpur-Santiniketan areas, noise level surveys were carried out at different areas. The study area is classified into three zones, each of them with a particular noise emission limits. The locations covering silence, residential and commercial zones and their results are discussed here. In the Bolpur-Santiniketan areas the main contributor of noise are transportation, community and religious activities. The noise data collected from various silence zone locations consisting of educational institutions, hospitals and religious locations. The L_{eq} values ranged from 40-75 dB(A), exceeding the standard values 50 dB(A) as shown in the **Fig. 1.** The minimum and maximum noise level was 20.5 and 75 dB(A) at Siksha-Bhavana and Bolpur High School respectively. The maximum L_{90} was observed at also Bolpur High School where the noise level exceeded 73.5 dB (A) at 90 % of the observed time.

Noise pollution from community activities and religious purposes is a growing environmental problem. The noise levels at residential locations of Bolpur-Santiniketan areas, varied from 25-85.5 dB(A). The maximum Leq value was recorded at Ratan Palli. The maximum L_{90} was also observed at Ratan Palli **(Fig. 2).** According to World Health Organization (WHO) guidelines, an indoor noise level of less than 30 dB(A) is required to ensure that the restorative process of sleep takes place effectively[12]. It is worth pointing out that in hot climates like Bolpur-Santiniketan area, where the majority of the residents leave windows open for the purpose of facilitating natural ventilation, indoor and outdoor noise levels are practically the same.

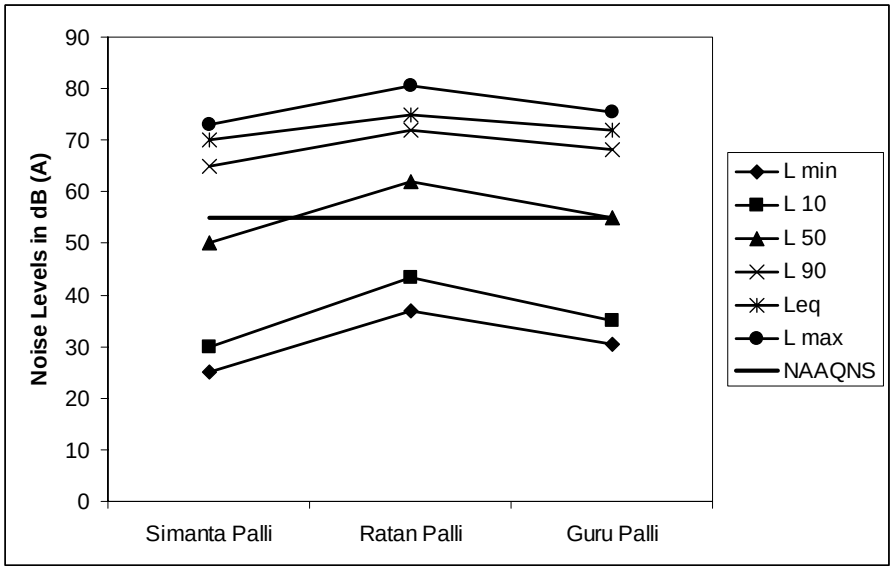

Fig. 2 : Noise levels at residential zone compared with standard at Bolpur-Santiniketan areas during June-December, 2005.

In India the growth of industrial, commercial and residential areas is unplanned, unstructured and unzoned. This leads to housing being built alongside factories and industries, increasing the risk of exposures to high noise levels. Rapid and unplanned development often results in growing levels of air and noise pollution, more pollution-related health problems, lost working days and economic disfunction. Apart from the silence and residential zones, noise pollution from road traffic in commercial area is a big problem in Indian urban centers. The noise measurements at commercial centres were also carried out to assess the impact on the community. The minimum level of 42 dB(A) was observed at Sriniketan Market and the maximum 98 dB(A) was recorded at Chaurastha **(Fig. 3).**

The observed noise level at Bolpur-Santiniketan areas are compared with other studies carried out in different parts of India and it was found that, other urban areas also faced the similar trend of noise pollution **(Table 2).** Thus there is a need to aware and educate the citizens about the rising noise pollution, health effects. Disseminate a key message that control of noise at individual's level will control noise pollution. There are many legal provisions to control or check the noise pollution. Many laws and acts have been amended to prevent the noise pollution but implementation of these laws is in vein.

Road traffic is a major source of noise in urban areas with far-reaching and wide range effect to human. India as a developing country, traffic noise pollution occurs seriously in its urban and suburban areas. Noise interferes in complex task performance, modifies social behavior and causes annoyance. Studies of occupational and environmental noise exposure suggest an association with hypertension and cardiovascular disease. Further research is needed examining the possible health consequences of adaptation to noise.

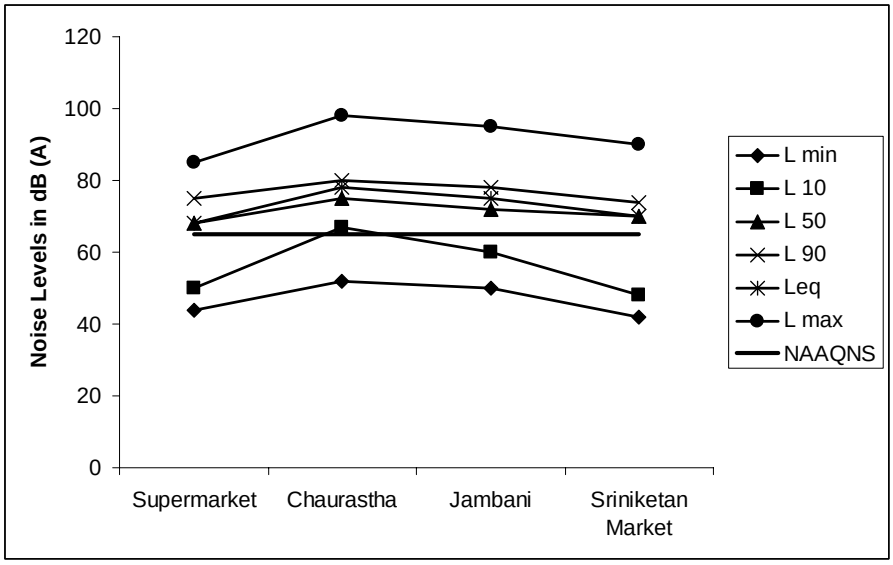

Fig. 3 : Noise levels at commercial zone compared with standard at Bolpur-Santiniketan areas during June-December, 2005.

Table 2 : Comparison of noise levels with other studies in India

City name	Silence Zone	Residential zone	Commercial zone
Burdwan[a]	60.0-90.0	--	69.0-110.0
Coimbatore[b]	47.2-80.4	30.6-83.6	40.0-96.4
Lucknow[c]	--	67.7-78.9	74.8-84.2
Visakhapatnam[d]	43.0-60.0	45.0-77.0	70.0-90.0
Bolpur-Santiniketan[e]	20.5-78.5	25-80.5	42.0-98.0

a : Datt, et al., (2006)
b : Thangadurai, et al., (2005)
c : Kisku, et al., (2006)
d : Vidyasagar and Rao, (2006)
e : This study

CONCLUSION

Noise pollution is emerging as an environmental problem in Bolpur-Santiniketan areas and also other parts of India. This can cause negative impact on public health and welfare. Considering the above aspects, we can conclude that traffic noise dominates the spectrum of environmental noise. The people staying in noisy area especially above 70 dB(A) should take precautionary measures in order to avoid noise induced hearing loss. Undoubtedly, there is a need for further research to clarify this complex area, including better measurement of noise exposure and health outcomes.

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