

Analysis of Heavy Vehicular Noise Pollution in Nagaon District of Assam, India

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Abstract- Sound which is undesirable for human hearing is called as noise. When there is a lot of noise from various sources, it constitutes what is called as noise pollution. Noise pollution can be caused due to various sources – there is street noise, traffic noise, and noise in public transport places, noise in playgrounds and parks, noise in the shopping malls, noise in workplaces..... One of the greatest sources of noise pollution is Heavy vehicles like Trucks and Buses. The Noise level in Nagaon District of Assam, India has been increasing rapidly due to rapid urbanization, uncontrolled movements of vehicles. Transport is the major contributor to noise in the town, especially from heavy vehicles like Trucks and Buses.

In this paper we are trying to present about the result of noise level in dB (A) on various points of Nagaon District. It has been found out that noise levels are more than permissible in all the investigated 27 spots (in each spot 15 no. of observations are taken) around the District. Result shows, the noise should be identified as the major environmental problem and should take necessary steps to minimize it.

Index Terms- Nagaon, Noise, Noise Pollution, Sound Level Meter.

I. INTRODUCTION

The environment today is polluted in terms of noise pollution. It has in the recent past, with the developments and the activities for comfort likewise have resulted in every spheres of life. Different countries have so far introduced various legislative measures to combat these problems. Various legislations have been imposed specially in developed countries but countries like India till date could reduce to some extent. In the recent days and days to come rapid urbanization and rapid industrialization with special reference to developing countries like India have reached its pick.

Rapid urbanization, motorization and industrialization become the primary cause of noise pollution. Countries like India are suffering a lot by this pollution in name of development. According to the Occupational Safety and Health Act (OSHA), exposure to high levels of noise for long durations may lead to hearing loss, create physical and psychological stress, reduce productivity and interfere with communication (OSHA, 2006). The main social consequence of hearing impairment is the incapability to understand speech in normal environment, which is considered as a social handicap (WHO, 2006). Sound that is classified as noise, such as the warning whistle from a train, is

actually beneficial for it acts as a warning for people during a potential dangerous situation.

Noise is defined as unpleasant, unexpected or undesired sounds. The word noise comes from the Latin word 'nausea' meaning seasickness and may be considered as unpleasant or disturbing sound. The word Noise is unacceptable level of sound that creates annoyance to people and interferes with conversation, disturbs sleep, causing stress and challenge to public health. High level noise may cause severe stress on the auditory and nervous system of people, particularly the children.

Noise pollution can be divided into three groups — industrial noise, community noise and traffic noise. In the case of traffic noise, major portion of traffic noise is contributed by heavy vehicles (Commercial Trucks and Buses) only. An uncontrolled movement of these heavy vehicles in the town creates so called 'traffic jam' and finally creates noise. Vehicle noise mainly arises due to three parameters i.e. engine noise, tire noise and nature of roads. The overall vehicular noise is also dependent on the characteristics of the vehicle flow, speed of the vehicles, and condition of the road and traffic management system. The relative proportion also depends on the type of highway, P.W.D. way, subway and specially the time of the day i.e. office time, school time, festive time etc. Motorized traffic is the major sources of noise pollution especially in urban areas. The people of Nagaon district are being exposed to high level noise pollution due to the uncontrolled movement of heavy vehicles especially in Haiborgaon bus stand, Haiborgaon Railway station, Nutan bazar, Hojai bus stand, Lumding etc. In turn the noise pollution is very closely related to urbanization and motorization. With the increase of number of heavy vehicles in the district together with the need of people, the hazard of noise pollution has increased and now it has exceeded the tolerance level. Noise pollution is the condition where the noise has the characteristics to injure public health or which unreasonably interferes with comfortable enjoyment of life and property.

Literature Review

Many surveys addressing the problem of noise pollution in many cities throughout the world have been conducted (Li et al., 2002; Morillas JMB, 2002; Alberola, 2005; Lebedowska, 2005; Pucher, 2005; Tansatcha et al., 2005 Kura et al., 1999; Ali and Tamura, 2003; Marius A., 2005), and have shown the scale of discomfort that noise causes in people's lives. Primarily noise problem is the result of growing busy traffic. Few studies on traffic noise level have been carried out at the different cities in India [Chakraborty, D., Santra, S. C., Mukherjee, Kudesia, V.P. and Tiwari, T. N. (2002), Nigam, S.P. (2002)] and observed that

average noise levels in their study areas are more than the standard recommended value i.e. 55 dB (A).

Table1: The noise standards in India for different types of areas are given below (CPCB - 2000).

Area	Day time 6 AM - 10 PM dB(A)	Night time 10 PM - 6 AM dB(A)
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Silence Zone	50	40

In Assam, due to rapid urbanization, motorization and population growth, the transportation sector is growing rapidly and number of vehicles on roads is increasing rapidly, which leads to overcrowded roads and pollution. It is also noticed that some outdated heavy vehicles (sand carrying trucks and goods carrying trucks) are moving freely in the district contributing a major portion of noise pollution. Therefore, an attempt has been made for comprehensive study of heavy vehicular noise pollution in Nagaon district of Assam. Nagaon district is one of the largest district of Assam. It is located at a distance of 123 kilometer by road from Guwahati. Nagaon district is located between 250 45/ to 260 45/ north latitudes and 920 33 / east and 930 20/ east longitude. Average altitude of Nagaon district is 60.6 meters above the sea level.

The objective of the study is that to identify the factors responsible for higher vehicular noise level in the district by measure vehicular noise by NOISE LEVEL METER in dB (A).

II. MATERIALS AND METHOD

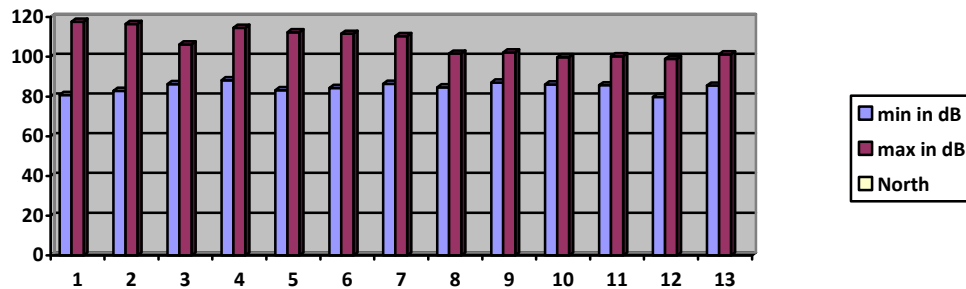
The vehicular noise levels are measured with the following standard procedure using calibrated sound pressure level (in dB) meter in decibel unit. The instrument consists of microphone, amplifier, network weighting (A, B, and C) and a digital display to read the noise level. Some observation and readings of vehicular noise level were taken on Nov., 2011 to Feb 2012 at some selected places of Nagaon district. In each selected sites, noise levels were measured in three different spots and on each spot, the measurement were taken at fifteen times during day time. The readings are taken by SLM from a distance of 5m. from the center of the road and placing it at a height of 1m.



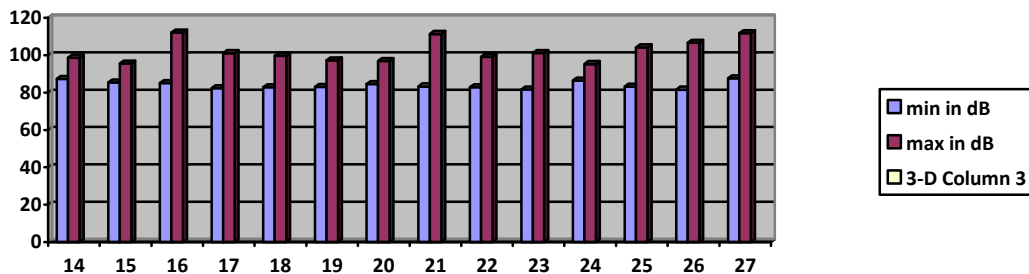
Table 2: Maximum and Minimum Readings Given By Slm in the Selected Places of the District

SI No	places	Spots	No of obs.	Min.(dB)	Max.(dB)
1	Haiborgaon (Nagaon)	Haiborgaon (Morigaon bus stand)	15	80.8	117.6
2		Haiborgaon Traffic point	15	82.9	116.5
3		Haiborgaon old AT Road	15	86.3	106.2
4		Haiborgaon Railway Crossing	15	88.2	114.6
5		Haiborgaon -Rupahi Bus Stand	15	83.2	112.3
6	Nagaon	Joyshree Cinema Point	15	84.3	111.6
7		Nowgong College Point	15	86.4	110.4
8		Panigaon Chariali	15	84.6	101.6
9		Natun Bazar Traffic Point	15	87	102.8
10	Nagaon	Nagaon Civil Hospital Point	15	86.1	99.8
11		Hojai-Lanka Bus Stand	15	85.7	100.2
12		Dhakaipatty(Hotel Bahagi)	15	79.8	98.9
13		SBI Main Branch Point	15	85.5	101.2

14	Raha	Raha Bus Sand	15	87.3	98.7
15		Raha Market	15	85.4	95.5
16		Near National Highway	15	85.1	112.2
17	Hojai	Main Bus Stand	15	82.3	101.1
18		Near Railway Station	15	82.9	99.6
19		Natun Bazar Point	15	83	97.2
20	Lumding	Bus Stand	15	84.6	96.9
21		Lanka-Lumding High Way	15	83.3	111.4
22		Lumding Bazar	15	82.9	99.1
23	Kalibor High Way	Kaliabor Tinali	15	81.7	101.2
24		Near Kaliabor College	15	86.4	95.3
25	Daboka	Daboka Bus Stand	15	83.2	104.2
26		Doboka-Nagaon High Way Point	15	81.6	106.7
27		Doboka-Hojai 4Lane Point	15	87.6	111.8



Bar diagram 1, shows comparative study of min. and max. Noise level in dB (A) in the spots of Nagaon and Haiborgaon of Nagaon district as measured by SLM.



Bar diagram 2, shows comparative study of min. and max. Noise level in dB (A) in Raha, Hojai, Lumding, Kaliabor and Daboka of Nagaon district as measured by SLM.

III. CONCLUSION

The aim of our study was to identify the specific places of the district which is not suitable for the human hearing or causes hearing impairment and problem in hearing. The study clearly indicates that noise pollution implies an unjustifiable interference and imposition upon human comfort, health and quality of modern life.

The recorded noise levels taken by Noise Level Meter in different places of Nagaon district of Assam in dB (A) is

assessed and analyzed. As there is no defined basic noise levels on the roads prescribed by CPCB, India, the detected noise levels of Nagaon district in day time are compared with the prescribed basic noise level (tolerance level) on roads traffic noise during day time at United Kingdom i.e. 70 dB(A) (Krishna Murthy et al., 2007). In all locations, the noise level has increased due to vehicular noise. It is found that in all places noise level exceed maximum value of minimum level of pollution and creating an environment with high level noise pollution and the study proves that Nagaon district is highly affected by noise pollution. This is because NH-37 is running through the middle of the town; the

breadth of the roads of the district is narrow compared to number of vehicles and rapid increase of number of vehicles. It is found that the loaded trucks, sand carrying trucks, Public Buses and other heavy vehicles are moving freely in the town causing high voltage noise. Same picture of noise pollution reflects in other places of the district. Therefore, Nagaon district administration, people and Govt. of Assam should take some imperative steps and regulatory measures to abate such vehicular noise pollution.

The study implies that natural vegetation, if high enough, wide enough, and dense enough, can decrease roadway traffic noise to some extents. The effectiveness in the screening of Vegetation plant noise barrier depends on the thicknesses of vegetation belts along the roadways and density and size of leaves (type of vegetation). Vegetation plant noise barrier are environmental friendly, having natural appearance and hence can be used as noise minimizer. This study was carried out to calculate the effectiveness of sound absorption from naturally grown vegetation under varying traffic conditions. Several places having naturally grown vegetation's on roadsides were selected for this study. Experiment proves that effective noise barriers can reduce noise levels by 4 to 6 decibels if is properly established and utilized. The measurements clearly show that noise absorption is linearly proportional to the width of the vegetation barrier.

General recommendation to reducing the noise pollution in these areas is:

- Restricting heavy vehicles movement within the urban and residential areas of the district.
- Banning of hydraulic horns, improvement and streamlining of roads and parking system, discouragement of high sound producing vehicles.
- Natural vegetation buffer zones and plantation of trees of high density must be created in these areas to minimize noise pollution.
- Public awareness would also helpful in reduction of the present noise level.
- Sustainable traffic management and proper town planning can also reduce noise pollution.
- Launching programs to monitor and control noisy vehicles on the roads.
- Older heavy vehicles should be replaced from the roads and District Transport Authority should be strict regarding this serious problem.

Together with these suggestions if the district administration takes bold steps to minimize noise pollution in the

district then in practical we can control noise pollution to save our future generation.

REFERENCES

- [1] Alberola J., Flindell H., Bullmore J., (2005), Variability in road traffic noise levels. European Commission, Environmental Noise Directive 2002/49/EC. Off. J. European Communities L189; 12-25.
- [2] Ali SA, Tamura A (2003), Road traffic noise levels. Restrictions and annoyance in greater Cairo, Egypt. Appl. Acoust. 64(8):815-823.
- [3] Chakraborty, D., Santra, S.C., Mukherjee, A. I., Roy, B. and Das, P. (2002), Road Traffic Noise in Calcutta Metropolis, India. Indian J. Environ. Health, 44(3), 173-180.
- [4] Krishna Murthy, V. Majumdar, A. K. Khanal, S. N. Subedi, D. P. (2007) - Assessment of traffic noise pollution in BANEPa, a semi urban town of Nepal. Kathmandu Univ. J. Sci. Eng. Tech. (4), 1-9.
- [5] Kudesia, V. P. and Tiwari, T. N. (2000), "Noise pollution and its control (Meerut, India: pragati prakashan)
- [6] Kura S., Moritomo M., Maekava ZI (1999). Transportation noise annoyance: a simulated environment study for road, Railway and aircraft noises, part I: Overall annoyance J.Sound Vibration 220(2)251-278.
- [7] Lebedowaska B (2005). Acoustic background and transport noise in urbanized areas: A note on the relative classification of the city soundscape. Trans.Res. Part D: transported environment. 19(4):341-345.
- [8] Li B, Tao S, Dawson RW (2002), Evaluation and analysis of traffic noise from the main urban roads in Beijing. Appl. Acoust. 63(10):1137-1142.
- [9] Morillas JMB, Escobar VG, Sierra JAM, Gomez RV, Carmona JT(2002). An environmental noise study in the city of Caceres, Spain. Appl. Acoust. 63(10):1061-1070.
- [10] Marius A., Tijnelis MD, Fitzsullivan BA, Sean O., Henderson MD (2005). Noise in the ED. Am.J.Emerg.Med.23 (3):332-335.
- [11] Nigam, S. P. "Introduction to noise" (2008) Noise control program, Thapar University, Patiala.
- [12] Pucher J. Korattyswaropam N. Mittal N, Ittyerah N (2005). Urban transport crisis in India. Transpo. Policy.12 (3):185-198.
- [13] Tansatcha M. Pamanikabud P. Brown AL, Affum J K (2005). Motorway noise modeling based on perpendicular propagation analysis of traffic noise. Appl. Acoust. 66(10):1135-1150.

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