

A Comparative Study of Noise Pollution in Some Cities of India

Dr. Manoj Kumar Ghosh¹, Mrs. Aakanksha lall², Dr. Sanjay Ghosh³

^{1,2}Department of Applied Chemistry, Parthivi College of Engineering and Management, Bhilai-3, Chhattisgarh, India
ghoshparthivi@gmail.com

³Department of Chemistry, Govt. N.P.G. College of Science, Raipur
Raipur-492010, India

Abstract: In this study we have compare level of noise pollution due to railway and vehicular traffic in various cities of our country viz. Jalandhar, Amravati and Raipur using digital sound meter along with the collection of traffic volume data. This study determines the level of noise and health impact due to rapidly growth of railway and road traffic vehicles. The main objective of this paper is to give a review about the noise pollution problem in various cities of India and its effect on the public health. Primary data reported that traffic noise pollution is the main cause of headache, high blood pressure, child issue difficulty and dizziness problems. Noise pollution has become major concern of environmental problems that uncomfot us in daily life and living within the city.

Keywords: Noise Pollution, Road Traffic Noise, Railways Traffic and Vehicles.

1. Introduction

The word noise has been derived from Latin word “Nausea” which implies ‘unwanted sound’ or unexpected’ or unpleasant [1]. Traffic noise is one of the most immediate and identifiable environmental problem associated with rapid industrialization, urbanization and population growth. Rapid urbanization, industrialization, expansion of road network and infrastructure causes severe Noise pollution problem [2]. Noise is an inevitable part of everyday life. Mild noise can be annoying, excessive noise can destroy a person's hearing. The slightest unwanted sound can become very annoying if it continues for lengthy period of time. The vehicular traffic and railways are the major sources of noise [3].

Sound is an auditory sensation produced by vibrating noises and its pitch, loudness and tone quality characterize it. It is generated by transport such as airplanes, trains and automobiles, industrial activities such as grinding, crushing and other activities such as loading and unloading of bulk and hard material, blowing of horns, sirens and from cinema halls, auditorium etc[4]. Noise pollution affects physical, physiological as well as psychological aspect of humans. It can cause various health hazards such as temporary deafness, straining and annoyance etc. while prolonged exposure to high noise levels can lead to permanent hearing impairment [5].

2. Measurement of Noise

The alarming increase in environmental noise pollution, have given the permissible noise standards. It depends on the location and period of day. Industrial areas obviously have somewhat higher acceptable sound levels than those prescribed for residential areas. The collected night standards are stringent than the daytime standards [6].

The permissible limits of noise levels for different urban areas prescribed by the Noise Pollution (Regulation and control) Rules, 2000 are given in the following Table of Permissible limits of Noise levels [7].

Table 1

S.NO.	Category of area	Day time intensity (in dB)	Night time intensity (in dB)
1.	Industrial Area	75	70
2.	Commercial Area	65	55
3.	Residential Area	55	45
4.	Silence Zone	45	40

3. Materials and Methods

The study was carried out using the Digital sound level meter. The study was carried out in selected locations of Raipur city, Jalandhar city and Amravati city i.e. in heavy traffic zones and highly populated areas. Digital sound level meter is an instrument that measures the sound level pressure in Decibel (dB).

3.1 Decibel Scale

Intensity of sound and noise is measured by a sound meter and is expressed in a unit called decibel (dB). Decibel is the one-tenth part of the larger unit Bel. The name Bel is given after the name of Alexander graham bell [7].

Decibel is the ratio expressed in logarithmic scale of intensity to be measured and a reference sound level[9].

$$dB = 10 \log_{10} I/I_0$$

where I = sound intensity to be measured, I₀ = reference sound level

Decibel can also be used as a measure of sound pressure level (SPL).

$$SPL \text{ or } dB = 10 \log_{10} P/P_0$$

3.2 Table for various sound levels:

Table 2[8]

S. No.	Sound effect	Sound level (in dB)
1.	Threshold of normal hearing	0 (Theoretical)
2.	Normal conversations	50-60
3.	Speech interference	75
4.	Annoyance/ irritation	80
5.	Disturbance in motor activity of man	90
6.	Physiological disturbance in man	120

Table 3: Permissible noise level in residential Areas[4]

S.no.	Locations	Acceptable noise level
1.	Rural	25-35
2.	Suburban	30-40
3.	Residential(Urban)	35-45
4.	Urban	40-45
5.	City	45-50
6.	Industrial Areas	50-60

4. Results and Discussion

All the days the recorded values are very-very high than the permissible levels. The maximum noise pollution is recorded is during the passage of train through level crossing which is notable. The effects of noise pollution are auditory and non-auditory. Deafness, heart attack, increase in cholesterol, high blood pressure, hyper tension, causes emotional disturbance, constriction of blood vessels such sever adverse effects are recorded due to the noise pollution.

Observed health impact of noise pollution[9]:

- Reduction in individual’s efficiency in work.
- Frustration
- Neutral stress
- Sleep interference
- Headache
- Irritability
- Speech interference
- Communication interference

Remedies to control noise pollution[10]:

- By controlling the number of vehicles
- By controlling public transport system
- There should be no signal kept by spacing of half K.M
- The airport should keep away from the colonies
- School, Hospital and Busy Office should keep away from the main route
- By keeping the colour of houses in light blue and green
- The building should be minimum and open space should be maximized
- Planting trees Viz.Cocus nucifera, Tamarinda indica
- Planting maximum greenery in commercial area.

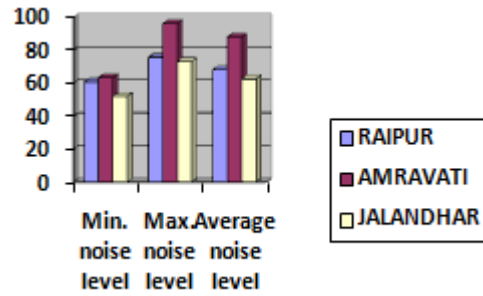


Figure 1 Showing Average noise levels of three cities.

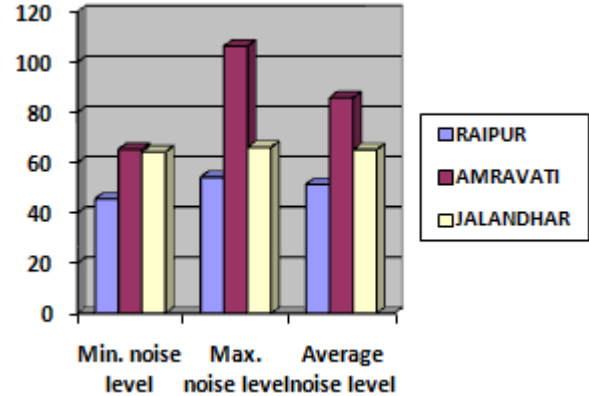


Figure 2 showing Average noise levels of three cities

It was observed from the above, data that most of the sampling station’s noise level from the three cities was higher from the standard limits.

5. Remedial Measures [10-11]

Since the fact that public health has been a matter of great concern for us, hence control of noise pollution is necessary. The remedial measure for noise pollution can be broadly classified as:

- control at source
- control in the transmission path
- Using protective equipment
- Vegetation
- use of suitable noise absorbing material for wall/door/window/ceiling will reduce the noise levels

The noise pollution can also be controlled at the source of generation itself by reducing the noise levels from domestic sectors, Maintenance of automobiles, Control over vibrations, Low voice speaking, Prohibition on usage of loud speakers and optimum selection of machinery, tools or equipment reduces excess noise levels[12].

6. Conclusions

From the above observations from the selected cities, it was found that the sound exceeds permissible limit which can adversely affect the local public. It is very necessary for all those people who are staying in a noisy area, especially above 70 dB should take precautionary measures in order to avoid noise induced hearing loss. In general, from all the locations the sound level is observed to be greater than the permissible limit throughout the daytime and very few samples were beyond the limit at night time.

References

- [1] C.T. Pawar M.V. Joshi, “Urban Development and Sound Level in chalkaranji city, Maharashtra, India”, *J Environ Ecoela.*, 10 (1), 157-159, 2005
- [2] V. Pathak ,B.D. Tripathi, V.K. Mishra , “Evaluation of traffic noise pollution and attitudes of exposed individuals in working place”*Atmos. Environment* 42(16), 3892-3898,2008
- [3] Davinder singh, Amandeep kaur, “Study of traffic noise pollution at different location in Jalandhar city, Punjab, India, *International Journal of Environmental Sciences and Research*, 2(2), pp. 135-139,2013
- [4] Anurag V. Tiwari, Prashant A. Kadu, Ashish R. Mishra, “Study of noise pollution due to railway and vehicular traffic at level crossing and its remedial measures, *American journal of engineering research*, pp16-19,2013.
- [5] Pratima Rani Dwivedi, Deepti Sahare, Karuna Rani Dwivedi, “Increasing noise pollution and its impact on Raipur city, Chhattisgarh-A case study”, *journal of environmental science, computer science and engineering & technology, Sec. A; Vol. 4.No. 4*, 933-938, 2015
- [6] Chawla, Shashi, *Theory & Practicals of Engineering Chemistry*, Dhanpat Rai & Co. Private Limited, Delhi. 1st Ed. 2011.
- [7] N.B.Singh, *Environment and Ecology*, S. brothers publications, 1st edition 2008.
- [8] Digvijay Sing, B. D. Joshi “Study of noise pollution for three consecutive years during Deepawali festival in Meerut City”, *Utter Pradesh. New York Science Journal*.
- [9] WHO, *Environmental health criteria of noise*, World HealthOrganization,pp12,1980.
- [10] Debasish Pal, Debasish Bhattacharya, “Effect of noise pollution on human work efficiency in government offices, private organizations & commercial business centers in Agartala using Fuzzy expert system: A case study, *Hindawi Publishing Corporation Advances in Fuzzy Systems Volume 2012*, Article ID 828593, 9 pages doi:10.1155/2012/828593.
- [11] T. Vidyasagar and G. N. Rao, *Noise Pollution Levels in Visakhapatnam City (India)*, *Journal of Environmental Science and Engineering*, 2006, 48, 139-142.
- [12] M.N. Rao, H.V.N. Rao, *Air Pollution Control*, Tata McGrawHill. 5. Peavy2008.