

Study of Noise Pollution Level in Various Zones of Vapi City in South Gujarat Region

Mr. Hemanshu Kishorbhai Rana

Lecturer

Department of Civil Engineering

Government Polytechnic, Waghai, Gujarat, India

Abstract— This paper deals with monitoring and result analysis of Noise pollution level measured for year 2015, in different zones of Vapi City situated in South Gujarat Region. Vapi City is the second Largest city in the South Gujarat Region after Surat and also Known as “Paper Hub” as the best quality paper producers are located in Vapi having more than 20 Kraft paper mills within a distance of 20 Km. In Present Study, measurements and its analysis is carried out to study Noise Pollution Level at 9 different measuring points with the use of “Sound Level Meter”. Nowadays in most of the cities around the world population, Industries and numbers of vehicles on road are increasing day by day. As a result of that Noise level increases on a daily basis. The increasing rate of Noise Level is causing adverse impact on Human being. Based on Noise pollution level monitoring, collective data will be analyzed and Noise pollution level control tips has suggested by adopting preventive measures on affected noise pollution zone.

Key words: Noise Pollution, Pollution, Noise Level, Noise, Sound, Vapi, Gujarat

I. INTRODUCTION

Environmental Noise pollution refers to unwanted and offensive sound that is being a one of the biggest threat to the human health around the world. It is continuously increasing in magnitude and severity on account of increasing population, urbanization and unreasonably intrudes in to the day by day human activities.

Nowadays, Noise pollution is one of the major environmental problems of urban communities which has many direct effects on human and its performance. Noise pollution is becoming an increasingly omnipresent, yet unnoticed form of pollution even in most of the developed countries. Most of major cities of the world is now facing adverse effects of enormous rise of noise pollution problems due to rapid growth of population, urbanization, increasing transportation, industrialization, and also excessive exploitation of natural resources.

Main sources of increasing noise level within the city are commercial and industrial activities, Household sources, social events and transportation .Out of these above sources vehicles and other transportation modes create about 2/3 part of total noise pollution continuously. Noise is very harmful to human and it cause serious health hazard .Noise pollution has many Physical effects, Physiological effects, Psychological effects as shown in Figure 1.

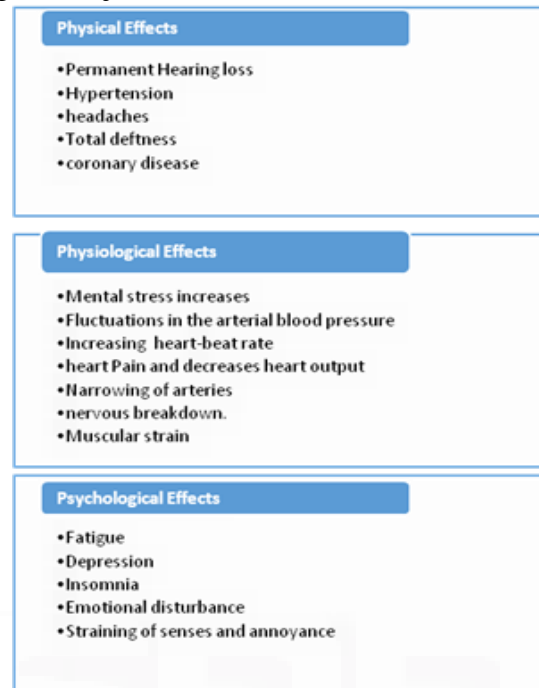


Fig. 1: Effects of noise pollution on human health

II. METHODOLOGY

The study was conducted in December-2015 in the city of Vapi. In order to determine the location of monitoring station, all main streets of the city Vapi were surveyed before the study. On these streets, Noise level measurement was carried out by using Sound Level monitoring instrument for 9 measuring points within main area which covered Residential, industrial and commercial zones of Vapi city, Gujarat, India. Vapi City is situated at Western part of India, is located at 20 0 22' N, 72 0 11' E..Measurements were taken during morning time between 8.00am to 12.00pm, at noon 12.00pm to 4.00pm and in evening time 4.00pm to 7.00pm. Sound Level Meter is used for the measurement of Sound pressure level of monitoring stations.

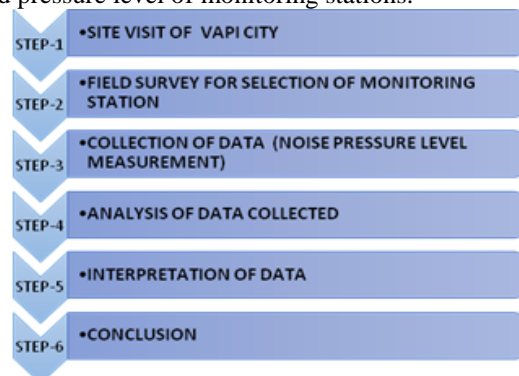


Fig. 2: Methodology of study
Sound pressure level measured on Dec 2015

TIME	MONITORING STATIONS								
	1	2	3	4	5	6	7	8	9
8.00 am TO 8.30 am	78.5	73.2	78.8	77	76.5	69	68	79.2	77.8
8.30 am TO 9.00 am	86.5	77.2	80.2	77.5	78	68.2	69.2	81.6	80.8
9.00 am TO 9.30 am	84	79.0	82.8	80.2	81.7	72.3	73.2	82.4	81
9.30 am TO 10.00 am	82	78.1	79.3	78.2	78.4	70	67.8	79.6	79.9
10.00 am TO 10.30am	83.2	79.3	78.9	77.6	77.5	70.4	70.1	80	79.7
10.30 am TO 11.00 am	81.7	77.4	81.4	75.8	77.7	67.7	69.1	79.8	78
11.00 am TO 11.30 am	80.4	78.5	78.9	74.7	78.2	68.7	71.7	77.7	79.8
11.30 am TO 12.00 pm	79.3	80.1	80.9	73.3	74.4	73.5	74.7	75.2	77.1

Table 1: Sound Level Measurement for 9 Monitoring Station of Vapi City from 8.00 Am to 12.00 Pm in Db

TIME	MONITORING STATIONS								
	1	2	3	4	5	6	7	8	9
1.00 pm TO 1.30 pm	78	76.3	80.4	68.3	69.9	67	73.3	68.6	78.3
1.30 pm TO 2.00 pm	78.3	79.90	78.7	75.4	76.3	67.3	72.8	78.5	79.3
2.00 pm TO 2.30 pm	78	82	69.5	76.7	77.6	67.5	79	75.3	82.2
2.30 pm TO 3.00 pm	81.8	79.1	78.7	77.3	77.7	69.8	74.8	78.4	79.9
3.00 pm TO 3.30 pm	83.4	77.8	85.3	79.9	73.6	67.4	77.8	80	83.5
3.30 pm TO 4.00 pm	84	78.2	81.7	79.7	77.6	69.3	76.9	78.8	81.7

Table 2: Sound Level Measurement for 9 Monitoring Station of Vapi City from 1.00 Pm to 4.00 Pm in Db

Monitoring stations:

- | | |
|--------------------------|---------------------------|
| 1) Gunjan Road | 5) Chanod colony |
| 2) 21st Century hospital | 6) Hariya rotary hospital |
| 3) Near Railway Station | 7) Ashdham school |
| 4) Near Bus depot | 8) Vapi GIDC |
| | 9) Vapi-selvasa Road. |

TIME	MONITORING STATIONS								
	1	2	3	4	5	6	7	8	9
4.00 pm TO 4.30 pm	81	78	82.3	80.1	78.4	70.3	79.8	77	78.6
4.30 pm TO 5.00 pm	80.7	78.6	79.8	78.7	78.8	69.9	74.3	79.6	79.4
5.00 pm TO 5.30 pm	80.6	78.9	80.1	79.5	80.6	70.3	78.4	79.9	82.8
5.30 pm TO 6.00 pm	81.3	79.7	78.8	74.7	76.4	68.3	73.3	78.2	80
6.00 pm TO 6.30 pm	79.3	81.8	77.7	78.1	78	70.5	76.4	75.8	79.7
6.30 pm TO 7.00 pm	80	81.4	78	77.3	77.5	72	76	77	79

Table 3: Sound Level Measurement of 9 Monitoring Station of Vapi City from 4.00 Pm To 7.00 Pm In Db

Monitoring stations:

- 1) Gunjan Road
- 2) 21st Century hospital
- 3) Near Railway Station
- 4) Near Bus depot
- 5) Chanod colony
- 6) Hariya rotary hospital
- 7) Ashdham school
- 8) Vapi GIDC
- 9) Vapi-selvasa Road.

Table 4: Noise Level Standards for Different Area In India

In present study, (1) As shown in Figure 3 It was observed that Sound pressure level is maximum 86.5 dB at 9.00 am near Gunjan Road (2) As shown in Figure 4 It was observed that Sound pressure level is maximum 85.3 dB at 3.30 pm near Railway station, Vapi (3) As shown in Figure 5 It was observed that Sound pressure level is maximum 82.8 dB at 5.30 pm near Vapi-Selvasa Road Circle.

III. RESULTS AND DISCUSSION

All monitoring 9 stations was inspected and Noise level measurement data were collected and analyzed for peak hours. A sound level meter was used for the measurement of sound pressure level. Data collected for total 9 monitoring stations for peak hours of Vapi town entered in Table I, Table II and Table III. Noise level standard for residential, commercial and Industrial area in India are given in Table IV.

Sr. No.	Zone /Area	Sound Pressure Level (dB)	
		Day/Noon	Evening/night
1	Industrial Area	75	70
2	Commercial Area	65	55
3	Residential Area	55	45
4	Silent Area	50	40

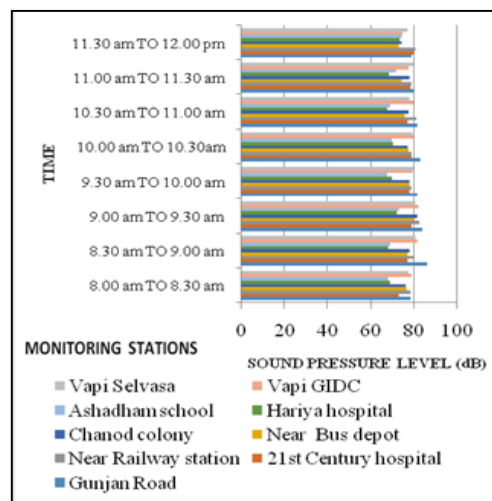


Fig. 3: Time (minute) v/s Sound Pressure Level (dB) From 8.00 am to 12.00 pm

IV. REMEDIAL MEASURES TO CONTROL NOISE POLLUTION

The adverse effect of noise pollution on human health and environment are quite severe. Noise pollution is produced from many sources. Among these all sources most significant source is from transportation, mainly traffic noise.

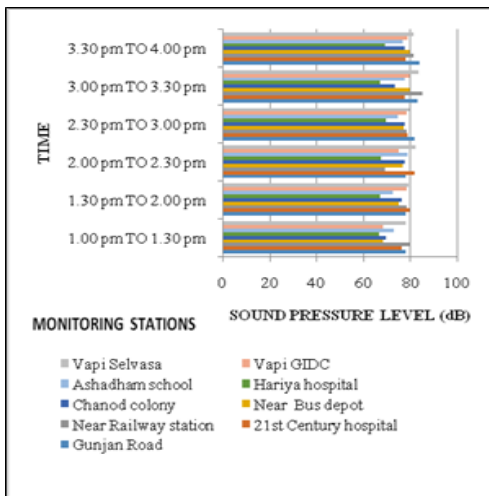


Fig. 4: Time (minute) v/s Sound Pressure Level (dB) From 1.00 PM to 4.00 PM

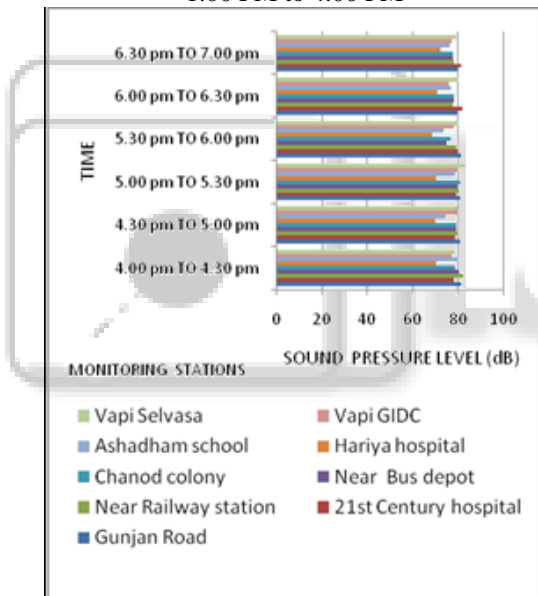


Fig. 5: Time (minute) v/s Sound Pressure Level(dB) From 4.00 PM to 7.00PM

In Vapi Town, Noise pollution can be controlled by implementing following remedial measures:

- The noise pollution can be reduced by creating Vegetation buffer zone in main parts of Vapi Town.
- Noise pollution can also be controlled or minimized by using good conditioned tyres and good roads as well as proper choice of fuel for vehicles.
- Use of suitable noise absorbing materials in construction of different building components such as doors, windows and walls results in reduction of Sound pressure level.
- Sound pressure level can be controlled by implementing a Tree Plantation scheme for Vapi Town.
- Strict enforcement of law for regular maintenance of vehicles and blowing air horn within the Vapi Town.

V. CONCLUSION

Noise Pollution is one of the major environmental problem around the world which can cause negative impact on human health and welfare .In present study, the measurement and analysis of sound pressure level leads to following conclusions:

- In all monitoring stations, Sound pressure level is above 75dB during 8.00 am to 12.00 pm which become physically painful to human
- Sound pressure level was recorded Maximum 86.5 dB at Gunjan road circle during 8.30am to 9.00 am.
- Sources of noise pollution are varied at different monitoring station as Traffic density at those monitoring stations were medium to high during peak hours
- Among all monitoring stations sound pressure level was maximum near Gunjan road circle and near Railway station area during peak hours. i.e. Average Sound pressure level above 80 dB.

REFERENCES

- [1] Subramani T.,Kavith M., Sivraj K .P., “ Modelling of Traffic Noise Pollution”, International Journal of Engineering Research and Applications, 2012, vol. 2 :3173-3182.
- [2] T. Vidya Sagar and G. Nageswara Rao. “Noise Pollution Levels in Visakhapatnum City (India)” Journal of Environ. Science and Engineering . Vol. 48, No. 2, pp 139- 142, April 2006.
- [3] Tang S. K. & Tong, K .K “ Estimating Traffic Noise for Inclined Roads with Freely Flowing Traffic”, Applied Acoustics,2004, vol.2, pp.171-181.
- [4] Lercher, P.,. Environmental noise and health: An integrated research perspective. Environ. Intern., 1995, vol. 22, pp.117-129.
- [5] Singh V. & Dev P., “Environmental Impact Of Noise Pollution , A Case Study in Saharanpur City, Western Uttar Pradesh , India”, International Journal of Earth Science and Engineering,,2010 vol. 3 (6), pp. 869- 874.
- [6] Ahmad Jamrah, Abbas Al-Omari and RemmSharabi “Evaluation Of Traffic Noise Pollution In Amman And Jordan”, Environmental Monitoring and Assessment, 2006, pp.499-525.
- [7] S.Sampath, S.M. Das and V. S. Kumar “Ambient Noise Levels In Major Cities in Kerala” J.Ind. Geophys. Union,2004, Vol 8, pp. 293 -298.
- [8] G. R. Dixit, T. N. Mahadevan and R. K. Kapoor“A Noise pollution survey of Bombay,Scavenger,1982. vol. 122,