

Monitoring Noise Levels of Vehicular Traffic on Peak Hours at Vijayawada Roads

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Abstract

The urban noise pollution is a universal problem and in the past few decades it has grown to the point that it has become a major concern for both the public and the policy-makers. Noise is a significant environmental problem in many Indian cities, transportation sector being a significant contributor. In this work an attempt is made to highlight the noise pollution levels in the Vijayawada, the second largest city in Andhra Pradesh. Experimental work is carried out to measure the noise levels in the city and also to find the variation of noise levels of the city with respect to standards. In this study four different locations are identified to measure noise levels, by using sound level meter. The noise levels are measured at different peak sessions i.e. morning (8AM to 10AM) and evening (6PM to 8PM) in the month of August 2018 (1st August to 30th August). The survey included areas around hospitals, colleges, residential and commercial areas. Noise levels were compared with standards prescribed by Central Pollution Control Board, India. Maximum noise level of 98 dB is observed in the morning time and minimum noise level of 32 dB is observed in the morning. It was understood clearly from our study that the noise levels are elevated in the selected areas. Hence, rapid growth of urbanization in Vijayawada is found to have severe environmental impacts and proper noise control measures are to be adopted for environmental sustainability.

Key Words: Vijayawada, Noise Monitoring, Traffic Junctions, Pollution, Sound Level Meter

I. INTRODUCTION

Vijayawada is the second largest urbanized city in Andhra Pradesh. Deteriorated air quality, polluted ground and surface waters, elevated noise levels, soil pollution due to disposal of garbage are common problems identified in Vijayawada city due to urbanization. Urbanization is the process by which large numbers of people become permanently concentrated in relatively small areas, forming cities. Traffic noise pollution has become a pervasive aspect of working and

living environments in most urban areas of the world, especially those in developing nations like India. Noise can be define as an unwanted or undesired sound whereas environmental noise is any unwanted or harmful outdoor sound created by human activities that is detrimental to the quality of life of individuals. The influence of excess noise on human body can be due to direct affects upon the auditory system, non-auditory physiological processes and on purely psychological mechanisms. Noise effect includes various impacts on mental and physical health and disturbance of daily activities which may affect sleep, conversation, lead to perception of annoyance, cause hearing loss, instigate cardiovascular problems as well as affect human judgment and performance. The permissible limits of noise levels for different urban areas prescribed by the Noise Pollution (Regulation and control) Rules, 2000 are given in the Table.1. The city map of Vijayawada shown in Fig.1. The description of significance of noise levels are presented in Table.2. The CPCB has notified air quality standards for noise which has been included as an air pollutant. Realizing the need to control and regulate noise levels, the Ministry of Environment and Forests, Government of India, have notified Noise Level Standards and Guidelines under Environment (Protection) Rules, 1986, known as Noise Pollution (Regulation & Control) Rules, 2000. Most of Vijayawada inhabitants rely on public transport to travel to and from their workplace. The major public transportation facility is catered by the City Bus Services and public buses which cover almost all parts of the city. Taxis, accommodating up to four passengers, cover most of the city. Auto rickshaws, were also allowed to operate in the local areas of the city, and are the main form of hired transport. These three-wheeler vehicles can accommodate up to three passengers.

Table.1 Permissible limits of Noise levels

Zone	Day, dB	Night, dB
Industrial	75	70
Commercial	65	55
Residential	55	45
Silence	50	40



Fig.1. Vijayawada City Map

II. MATERIALS AND METHODS

Measurement and evaluation of traffic noise: The noise levels were measured at with the help of a portable precision digital sound level meter (Model-SL-4010), Lutron. This instrument is primarily designed for community noise surveys. A large digital display gives a single value indication of the maximum ‘A’ weighted RMS (root mean square) sound pressure level measured during the previous second. It is equipped with high sensitivity Bruel and Kjaer prepolarized multi-function acoustic calibrator model 4226 condenser Measurements from 30 dB(A) to 135 dB(A) can be carried out with this instrument. The

Table.2. Significance of Various Noise Levels

S.No.	Noise Level, dB	Significance
1	10	Almost quiet, Breathing
2	20	Rustling leaves, Ticking watch
3	30	Whisper, Quiet rural areas
4	40	Quiet library, Bird calls
5	50	Quiet office, Moderate rainfall
6	60	Normal Conversation at 3ft.
7	70	Busy traffic, Vacuum cleaner
8	80	Loud music, Alarm clocks
9	90	Diesel truck, Power mower
10	100	Motor cycle, Blow dryer
11	110	Concerts, Screaming child
12	120	Threshold of pain, Thunder

instrument calibration was achieved using pistophone calibrator capable of producing known sound pressure level, supplied by the manufacturer. Noise levels at 4 different spots were recorded in the month of August, 2018. When the instrument was switched on, a range was selected which was ideal for the surrounding. 18 readings were taken at each site using suitable between 8am to 10am and 6pm to 8pm, the peak hours of morning and evening. The readings were taken at traffic junction. The study area covers four major traffic junctions of the city, viz, Benz Circle (BC), IBM Ring (IBMP), Ramavarappadu Ring (RR) and City Bus Port (CBP). The descriptions of the selected locations are explained in Table.3.

Table.3. Noise monitoring areas in Vijayawada City

Zone	Name of the zone	Description
A	City Bus Port	High traffic volume. Commercial. Private vehicles, buses and taxis
B	Ramavarappadu Ring	High traffic volume. Industrial and commercial. Private vehicle, buses and taxis, trucks.
C	Benz Circle	High traffic volume, residential. All types of vehicles including autorickhaws (Three wheelers), trucks and buses. High street commercial.
D	IBM Ring	High traffic volume. Residential and Industrial. All types of vehicles.

III. RESULTS AND DISCUSSIONS

Noise values recorded at 4 sites in Vijayawada city on peak hours. The monthly average values of August 2018 are shown in Table.4. The minimum levels of noise in selected places were given in Fig.2. and the maximum noise levels were plotted in Fig.3. Since there are no prescribed norms for noise on the roads, for the sake of convenience the norm prescribed by the

Central Pollution Control Board is used as a reference. **The minimum noise levels in the selected locations are 48dB in benzcircle, 42dB in ramavarappadu ring, 41dB in city bus port and 32dB in ibm ring. The maximum noise levels in the selected locations are 94dB in benzcircle, 88dB in ramavarappadu ring, 98dB in city bus port and 90dB in ibm ring.**

Table.4. Recorded Noise Levels at Vijayawada

Time	Benz Circle		Ramavarappadu Ring		City Bus Port		IBM Ring	
	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
8:00	94	56	88	42	98	45	75	32
8:15	78	52	82	62	83	52	83	58
8:30	82	54	84	56	84	52	87	56
8:45	85	56	84	56	84	52	87	56
9:00	89	51	84	52	85	52	88	56
9:15	88	62	85	52	85	52	88	55
9:30	90	64	85	52	85	51	88	55
9:45	87	56	85	52	85	51	88	55
10:00	94	65	85	52	85	51	88	55
18:00	88	68	72	68	98	56	90	62
18:15	98	51	81	65	82	55	83	58
18:30	88	63	82	59	83	59	80	61
18:45	84	61	85	57	83	49	83	59
19:00	85	67	85	56	84	51	83	58
19:15	87	59	85	56	84	51	83	47
19:30	88	54	85	56	84	43	81	56
19:45	92	48	85	57	85	62	83	57
20:00	80	48	83	57	85	41	83	63

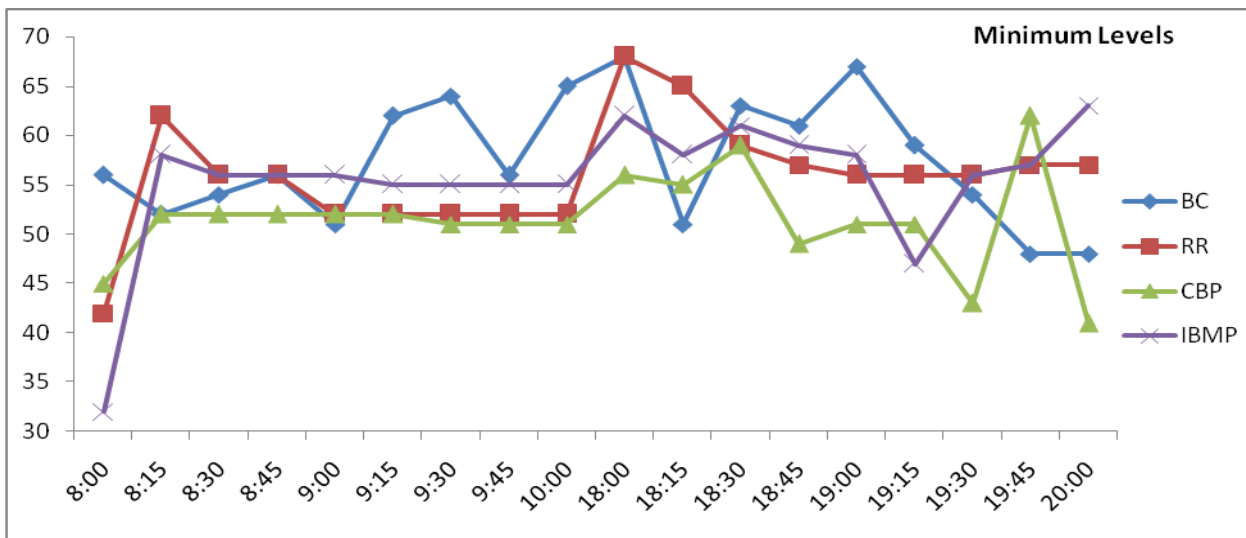


Fig.2. Minimum Recorded Noise Levels

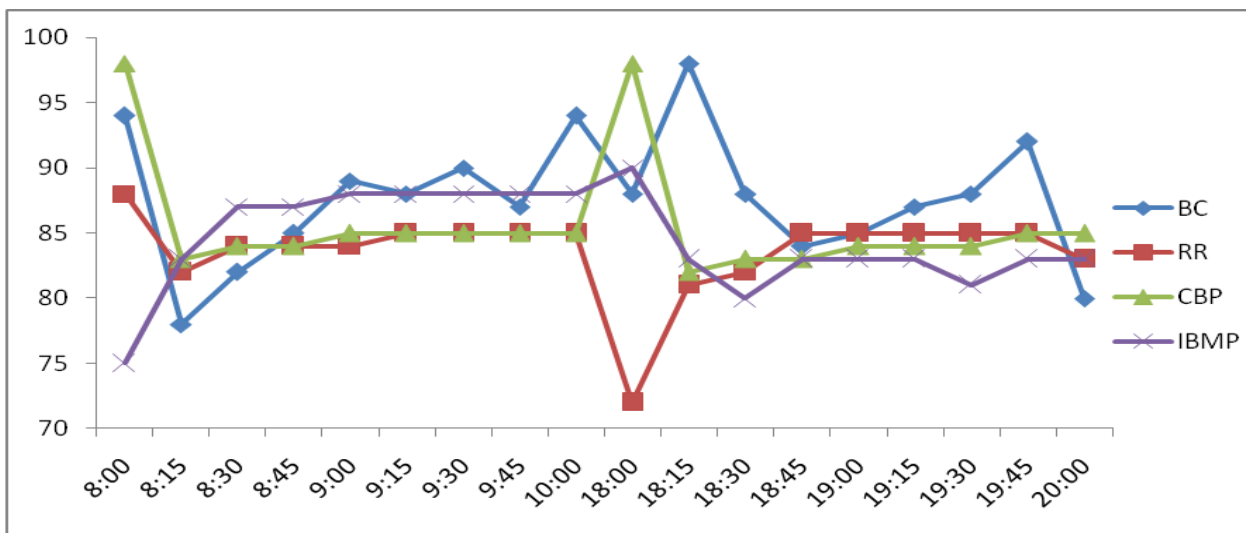


Fig.3. Maximum Recorded Noise Levels

IV. CONCLUSIONS

The residential areas in majority of the zones are associated with commercial activities that tend to attract more traffic movement and consequently higher noise pollution. Construction activities also are one of the factors of noise pollution. The road network has got extended by construction of flyovers. Noise levels in most of the areas are above permissible levels. Silent zones like colleges and hospitals also suffer from high levels of noise in comparison with the prescribed levels by Central Pollution Control Board. The sampling locations comprised of industrial, commercial, residential, sensitive and mixed areas. The city has undergone heavy and unplanned growth and development and hence suffers from high noise pollution in most areas. It was observed that the average of minimum noise level recorded in the city was 49.7dB and the maximum level of 64.7dB.

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