ISSN (Online) 2278-1021
ISSN (Print) 2319 5940

International Journal of Advanced Research in Computer and Communication Engineering
Vol. 4, Issue 10, October 2015

Honking with Reduced Effect on Noise Pollution

Pratik Doshi[1], Prem Halani[2], Vinit Jasoliya[3], Madhur Jain[4], Prof. Vinaya Sawant[5]

Dwarkadas J. Sanghvi College of Engineering, Mumbai, India[1, 2, 3, 4]

Assistant Professor, Dwarkadas J. Sanghvi College of Engineering, Mumbai, India[5]

Abstract: Transportation sector is one of the major contributors to the noise pollution in urban areas. Various researches show that honking is one of the major causes for noise pollution. This constant increase in noise pollution due to honking needs to be restrained effectively. We present you various techniques which can be implemented to reduce the impact of honking on noise pollution without reducing the effectiveness of honking.

Keywords: Honking, Noise Pollution, Vehicles, Noise.

I. INTRODUCTION

Noise pollution, a by-product of urbanization and industrialization, is now recognized as a major problem in urban areas with many adverse health effects. According to Deepak Parasher, Professor, Audiology at University College in London, noise pollution causes more deaths than heart diseases around the world. The most important factors raising noise pollution in urban areas are vehicular traffic, railway and air traffic. Vehicular traffic contributes to about 55% of the total urban noise. The need for studies regarding urban noise pollution and its consequences on the environment has motivated various researchers in several countries including India. Most cities in India have been facing serious noise pollution problems in the last few decades due to substantial growth in the number of vehicles, expansion of road network, industrialization and urbanization.

Assessment of traffic noise pollution is not easy and varies with types and physical conditions of vehicles, speed, honking and road geometry. Estimation of traffic noise is more difficult in Indian cities considering the heterogeneity in traffic conditions including mixed vehicle types, congestion, road conditions, frequent .honking and lack of traffic sense. Honking is a common occurrence in India, irrespective of road types and condition, traffic etc. Driving attitude which includes impatience, over accelerating, sudden braking, abiding traffic rules etc. may also aggravate honking. They found that horn noise events increase equivalent noise level (L_{eq}) 2 to 13 dB. Therefore, there is a need to consider such diverse factors in monitoring and assessment of traffic noise as well as planning of noise abatement measures [1]. The objective of the study is to assess and quantify traffic noise and the impact of honking on it in the urban environment of Mumbai, India and then define ways and identify their efficiency in reducing noise pollution through honking.

II. EXISTING SOLUTIONS

A. Solution 1

Creating silence zones near the hospitals and educational institutions in the city. This being an existing rule to reduce the disturbance to hospitals and educational institutions has also been able to reduce the noise levels in surrounding areas. Thereby also reducing the impact of noise pollution on the residents in the vicinity of hospitals and educational institutions.

B. Solution 2

Using dipper lights at night instead of honking. This solution was proposed by RTO to increase the road safety as dipping the lights at night which flash in the driver's eyes has greater impact than honking. This solution also reduced noise pollution through honking. But the implementation of this solution was restricted only during the night time, thereby reducing its efficiency.

III.SURVEY BY MPCB

In order to assess the ambient noise levels in the environment during a working and a non-working day, Maharashtra Pollution Control Board (MPCB) took an initiative to carry out Noise monitoring at 25 locations in metropolitan cities of Maharashtra for 2 days period i.e. on 14th (Sunday) and 15th (Monday) of December, 2014 for 24Hrs. The main aim of the project is to determine the trends and variations of noise levels at various areas of the city in different land uses and to create awareness about noise pollution through availability of scientific noise level data. [2]

A. Methodology of the Survey

The Noise Level Monitoring in six Metropolitan cities for 24 hours continuously (16 hrs day time & 8 hrs night time) was carried out on 14th (a holiday) and 15th (a working day) of December, 2014. The monitoring was carried at the same locations during both days and during the same period. Noise standards for ambient noise level during day and night are different; hence noise levels were measured accordingly as follows:

- Day shift from 6:00 Hrs. to 22:00 Hrs.
- Night shift from 22:00 Hrs. to 6:00 Hrs.

TABLE I Standards of Noise Levels under EPA (1986) Noise Pollution (Regulation & Control) Rules, 2000

Area Code	Category of Area	Limits in dB (A) L_{eq}	
		Day Time	Night Time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

DOI 10.17148/IJARCCE.2015.41077

ISSN (Online) 2278-1021
ISSN (Print) 2319 5940

International Journal of Advanced Research in Computer and Communication Engineering
Vol. 4, Issue 10, October 2015

Table 1 describes the limits of the noise levels in dB (A) categorised by different areas.
1. Day time is reckoned from 6 A.M. To 10 P.M.
2. Night time is reckoned in from 10 P.M. and 6 A.M.
3. Silence zone is referred as areas within 100 meters around premises such as hospitals, educational institutions and courts. The Silence zones are to be declared by the Competent Authority.
4. Use of vehicular horns, loudspeakers and bursting of crackers shall be banned in these zones.
5. Mixed categories of areas should be declared as one of the four above mentioned categories by the Competent Authority and the corresponding standards shall apply.

B. Survey Results

The following were the results observed over the duration of 2 days at various locations in Mumbai:
A total of 10 locations were monitored continuously for two days from 14th to 15th December, 2014 for 24 hours (as shown in Table 5.2). It was observed that, on 14th December, among all the 10 locations Santacruz Airport was found to have maximum noise level during day time with **82.9 dB(A)** and Shivaji Park, Dadar with **82.8 dB(A)** was found to have maximum noise level during night time and on 15th December, Vashi Naka, Chembur was found to be have the maximum noise level during day time with **92.3 dB(A)** and Goregaon (E) with **87.9 dB(A)** was found to have maximum noise level during night time. The present study also shows that in the silence zones, the average minimum and maximum sound level of **54.2 dB(A)** and **69.6 dB(A)** was observed at Mumbadevi Temple on 15th December during night time and on 14th December during day time respectively.

The following were the results observed over the duration of 2 days at various locations in Pune:
A total of 3 locations were monitored continuously for two days from 14th to 15thDecember, 2014 for 24 hours. In all three locations, on 14th December, Pune University was found to have high sound level of **84 dB(A)** and **69.8 dB(A)** both during day timeand night time respectively and on 15th December also Pune University was found tohave high sound level of **84 dB(A)** and **70.8 dB(A)** both during day time and night time respectively. The present study also shows that In the silence zone, the average minimum noise level of **42 dB(A)** was found on 14thDecember at night time and the average maximum noise level of **84 dB(A)** on 14thDecember at day time.

The following were the results observed over the duration of 2 days at various locations in Aurangabad:
In Aurangabad also 3 locations were monitored continuously for two days from 14th to 15th December, 2014 for 24 hours. It was observed that on 14th December, among all the locations Nirala Bazar had the highest noise level at day time and at night time with **72.4 dB (A)** and **64.5dB(A)** respectively. On 15th December, Nirala Bazar had the highest noise level at day time and night time with **73.2 dB (A)** and **64.2 dB (A)** respectively. The present study also shows that in the silence zone, the average minimum sound level was **51.6 dB (A)** and the average maximum sound level was **63.5 dB (A)** [2]**.**

Similar above noise limit noise levels were recorded at Nashik, Nagpur and Kolhapur in Maharashtra by MBCP. Thereby show casing that the above solutions are not efficient enough to put a halt on constantly increasing noise pollution due to vehicular noise.

IV. PROPOSED SOLUTION

Our solution is based on replacing the sound generated while honking with transmitting a signal which can be caught by the receivers fitted in other vehicles. The solution involves fitting a transmitter and a receiver in very vehicle. The moment driver needs to honk to providing indication to the vehicles ahead, instead of producing sound signal, the transmitter will transmit a signal which will be received by the receiver in other cars in a specified range. Processing the signal caught by the receivers in the vehicle, we can indicate the driver as some car is trying to overtake or is honking from a deduced direction. Also, we plan to fit a small 2 inch X 2 inch LED indicator on the dash board or in the line of sight of the driver which can provide the indication of direction by flashing LED lights.
The solution can be implemented in various ways. These various ways and their respective pros and cons are discussed below:

A. Method 1

Using Bluetooth transmitter and receivers to transmit the data signal between two vehicles.

Advantages: Low cost implementation.

Disadvantages: Limited range of Bluetooth makes it useful for transmitting data over short distances but cannot be used when distance between the vehicles is beyond 100 meters example highways.

B. Method 2

Using infrared signals to transmit the data between the two vehicles.

Advantages: Low cost implementation.

Disadvantages: Infrared works in line of sight i.e. the receiver needs to be in the straight line and in sync with the transmitter in order to catch the signal and process it further. This cannot be the scenario every time as the vehicles on road might not be travelling in the straight line always.

C. Method 3

Using Radio Waves to transmit the data between two vehicles.

Advantages: No range limit.
Can pass through obstacles.

Disadvantages: Using radio waves it is difficult to sense the direction of the signal transmission as the radio waves are omnipresent. Therefore to guess the direction of transmission we need to use multiple receivers in the vehicle and then comparing the intensity of the signal received we can guess the direction of the transmission. But the efficiency of this method is hampered when the vehicles are on slopes like bridges.

DOI 10.17148/IJARCCE.2015.41077

ISSN (Online) 2278-1021
ISSN (Print) 2319 5940

International Journal of Advanced Research in Computer and Communication Engineering
Vol. 4, Issue 10, October 2015

D. Method 4

Using a Global Positioning System (GPS) module along with Radio Frequency (RF) transmitter.

The GPS module updates the location of the vehicle in real time. So every time the driver presses the honk, the RF transmitter will transmit the location of the vehicle in free space. Other vehicles fitted the receivers can catch the signal and compare it with the current location of their vehicle. Using this comparison, we can indicate the driver with location of the transmitter along with the approximate distance between the two vehicles.

Advantages: No range limit.
Can pass through Obstacles.
High accuracy.
Data is not hampered on sloppy terrains.

Disadvantages: Costly implementation as compared to others.

V. CONCLUSION

Considering the above advantages and disadvantages of various methods, we feel that the Method 4 is most efficient. Using the GPS module provides various added benefits over others as providing the distance between two vehicles. Also many high end cars are already fitted with GPS module thereby reducing the cost in such scenario further.

Implementing this solution can directly reduce the impact of honking of noise pollution through a considerable level. It can directly reduce the 2 dB (A) to 13 dB (A) impact of honking on equivalent noise levels.

REFERENCES

[1] Ritesh Vijay, Asheesh Sharma, Tapan Chakrabarti and Rajesh Gupta, "Assessment of honking impact on traffic noise in urban traffic environment of Nagpur, India", Journal Of Environmental Health Science & Engineering, DOI 10.1186/s40201-015-0164-4

[2] Maharashtra Pollution Control Board, "Report on Ambient Noise Monitoring of Metropolitan Cities in Maharashtra – 2014".

[3] Rajeev Kumar Mishra, Dr. Santosh Ragnekar, Dr. Manoranjan Parida, "Survey on Noise Pollution and its Management", Journal of the IPHE, India.

[4] "Noise Level in Metropolitan Cities, Part-1: Delhi", Control of Urban Series: CUPS/33/1991, Central Pollution Control Board (Indian), 1991.