

Comparative studies of Noise Levels on No Honking day and Regular day in Mumbai City, India

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Abstract— Noise Mapping is a study made to differentiate the city into zones according to different Noise levels. It records Noise as is actually present in a location and compares it to the ideal noise levels, as stipulated by the standards given. A comparative study was conducted on four strategic locations in Mumbai city on No-Honking day and Regular day using a Sound Level Meter (SLM). The L_{eq} , Noise Climate, and Noise pollution levels were calculated. It was found that there is a considerable difference in noise levels on no honking day and regular day, although the overall readings were very high and above the permissible limits. The average values throughout were 70-80dB.

Index Terms— Noise Mapping, Sound level meter, L_{eq} , NC, Lnp

I. INTRODUCTION

The city of Mumbai is a commercial capital of India with massive development projects both infrastructural and commercial types taking at a very fast pace. There is an increase in the noise produced on a daily basis. Mumbai is the 3rd noisiest city in the world. Studies on noise pollution was undertaken by Maharashtra pollution control board, and Central pollution control boards. Regular monitoring however is undertaken only during festival days by these government agencies. Lot of Geographical work concerning noise has also been done including noise mapping by Vyas (Vyas, 2002). Noise Mapping makes the government aware and hence enables them to take suitable measures in reducing it, thus leading to proper town planning. The city of Mumbai has different land use patterns with the eastern parts being more industrial, south Mumbai commercial, central Mumbai being congested and western suburbs a conglomeration of various developments. The traffic pattern and types of vehicles too differ in various parts of the city, with restrictions of public autorickshaws in the suburbs. Thus it became imperative to study noise levels in the study on a large scale and identify the critical areas.

Along with other types of pollution, noise has become a hazard to quality of life (Davar, 2004). Various studies have revealed that noise levels in some of the Indian cities are higher than the standards prescribed by CPCB, Central Pollution Control Board and MoEF, Ministry of Environment and Forest, Govt. of India (Naik, 1999; Mohan, 2000; Gupta, 2003; CPCB, 2012; Joshi, 2012; Mangalekar, 2012; Kumar, 2001). Several studies have been carried out in India on noise levels, noise climate, L_{eq} , and L_{max} (Nikhil kumaret al, 2013; Chaudhary et. al, 2012; Tandel, 2011). In collaboration with

the Mumbai Traffic police and the then DCP Harish Baijal, a special study was conducted on No honking day, on 7th April, 2008. People made special efforts to regulate their honking on this day. The objective of the study is to assess the noise pollution levels, noise climate, L_{eq} , and L_{max} . Noise Pollution Level Index and Noise Climate in this city on No-Honking Day and a Regular day.

II. MATERIALS AND METHODS

Noise levels at four different places of Mumbai were recorded using basic Sound Level Meter (Model no. SL-4010) on 7th April, 2008. The four locations studied were Jagannath Shankarshett Road, Charni Road (East), Old Nagardas Road, Andheri (East), Daftari Road, Malad (East) and J.S.D Road, Mulund (East). (Table 1.1 & Table 1.2). All these spots were on busy main roads with high traffic levels. When the instrument was switched on, a range was selected which was ideal for the surrounding. (The instrument has 3 ranges 35-80dBs, 50-100dBs and 80-130dBs). After the selection of the range the microphone was pointed or faced towards the traffic, which was the noise source. Since the instrument showed fluctuating values depending on the changing noise levels, a method was devised to maintain uniformity. Readings were recorded after every 10 secs. After 10 secs whatever value was displayed on the SLM screen was noted down. 100 readings were noted between 9am till 11pm to calculate the average value. The data was further used to calculate L_{eq} (Eq. 1), Noise climate (NC) (Eq. 2) and Noise pollution level (Eq. 3) (Ehrampoush M., 2011).

L_{eq} was calculated using following formula.

$$L_{eq,T} = 10 \log \left[\frac{1}{n} \sum_{i=1}^n 10^{L_i/10} \right] \dots \dots \dots (1)$$

Where, L_{eq} = noise levels observed in time interval T and n = nth duration of measurement

L_{eq} is the equivalent continuous equal energy level; and can be applied to any fluctuating Noise Level. It is that constant Noise Level that over a given time expends the same amount of energy as the fluctuating level over the same time period. (MPCB, 2005., P. Saler, 2012). The readings noted in fractions, were rounded off to nearest integer in the observation tables. To detect the actual rise in the noise level a set of readings was taken on a normal working day. To get better understanding of noise range noise climate (NC) index (Pathak, 2008) was calculated using following formula:

$$NC = L_{10} - L_{90} \text{ dB (A)} \dots \dots \dots (2)$$

Total annoyance caused by noise level was estimated using noise pollution level index (NP) (Ehrampoush M., 2011)

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$$LNP = L_{eq} + 2.56\sigma \quad (3)$$

Where, L_{NP} = Noise pollution level, L_{eq} = equivalent noise level, σ = standard deviation

Statistical analysis were carried out to analyse the significant difference between No-Honking day and a regular day.

III. RESULTS AND DISCUSSION

Table 1.1 Noise Levels in dB, Noise Climate and Noise Pollution Levels in the study on No-Honking Day

Sr No	Location	Highest value	Lowest value	Avg (dB)	Leq	NC	Lnp
							(NPL)
1	Charni Road	83	47.2	67.89	77.89	13.48	95.82
2	Andheri-E	89.6	46.6	67.28	81.30	18.24	102.6
3	Malad-E	75.4	66.3	74.74	81.85	9.08	92.38
4	Mulund-W	75.5	53.6	70.02	76.68	9.08	88.61

Table 1.2 Noise Levels in dB, Noise Climate and Noise Pollution Levels in the study on a Regular Day

Sr No	Location	Highest value	Lowest value	Avg (dB)	Leq	NC	Lnp
							(NPL)
1	Charni Road	89.5	47.9	71.76	83.27	13.96	104.08
2	Andheri-E	89.6	46.6	68.45	82.83	21.38	106.05
3	Malad-E	75.4	66.3	75.38	83.93	11.82	96.81
4	Mulund-W	75.5	53.6	70.04	76.70	5.12	88.62

Fig 1: Comparison of Noise Pollution Levels at different locations on a Regular day and No Honking Day

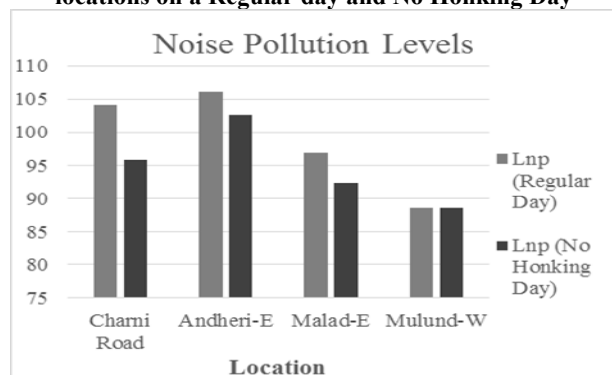


Table 1.2 shows overall higher readings at all the four locations on a Regular Day. The highest value is seen at

Andheri-E (89.6dB) followed very closely by Charni Road (89.5dB). Similarly the lowest value is seen again at Andheri-E (46.6dB) followed by Charni Road (47.9dB). The lowest average value is seen at Andheri-E (68.45dB) and the highest average value is seen at Malad-E (75.38dB). In contrast to this the lowest Leq value is seen at Mulund-W (76.70) and highest Leq value is seen at Malad-E (83.93). The lowest Noise Climate value is seen at Mulund-W (5.12) and the highest NC value is seen at Andheri-E (21.38). The highest Noise pollution value (Lnp) is seen at Andheri-E (106.05) and the lowest NPL value is seen at Mulund-W (88.62).

As seen in table 1.1 there is a significant decrease in noise values throughout the study area on a No Honking Day in comparison to a Regular Day (Table 1.2). The highest value is seen at Andheri-E (89.6dB). There is a drop in the highest value at Charni Road by 6dB (83). The lowest values are same as the regular day readings at Andheri-E(46.6dB) followed by Charni Road (47.2dB) The highest average value is seen at Malad-E(74.14dB) and the lowest average value is seen at Andheri-E(67.28dB) followed by Charni Road(67.89dB). The lowest Leq value is seen at Mulund-W(70.2) whereas the highest Leq value is at Malad-E(81.85). Malad-E and Mulund-W both show low Noise Climate values (9.08). There is a decrease in the highest Noise pollution value (Lnp) by 4dB as seen at Andheri-E(102.6). The lowest NPL value still remains the same as seen at Mulund-W(88.61). The possibility of higher readings at Andheri-E is due to its close proximity to the airport and also high density of autorickshaws running on this road. This area also shows maximum deviation from the noise values. Other such deviation in noise levels is also seen at Charniroad(89.5dB), this area is in a busy commercial zone of the city, on a regular day .

CONCLUSION

Public awareness needs to be created to keep the noise levels within the permissible limits. Different parts of the city showed different patterns of noise levels and noise climate. However it is evident that the city experiences high levels of noise pollution due to difference in the type of transports permitted in an area. Charni road area shows less noise due to restrictions on movement of autorickshaws or heavy Whereas Andheri and Malad showed high noise pollution levels due to high traffic density, all types of vehicles moving in this area and narrow roads. As seen in Fig 1 it was observed that noise was significantly low on No Honking Day. This could be due to the awareness created by police authorities. More support from the police authorities will help by having strict rules with hefty fines.

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Author's Profile



Dr. Ambika Joshi is the Head of the Department of Botany, Jai Hind College. She has been teaching Botany since 1983 and MSc since 1987. She was recognized to guide PhD students and has successfully guided several students for PhD and currently registered 2 more students. She has various research papers to her name and also presented papers and posters at National & International conferences. She has been a Co-ordinator, Biotechnology. She has worked as a Principal Investigator for a Major UGC project- 'Noise Mapping- a case study of Greater Mumbai'. She has been a member Board of Studies since 2005-2010 and is currently the Chairperson of Adhoc Board of Studies (Botany), Mumbai University. She has been a Resource person for various workshops and conferences. She is a Fellow of FICCI and ISEB. She is a member of Research Committee at Jai Hind College as well as the Mumbai University. She has been a Convener and Organizer of an International Conference 'Planet Earth- Take care.. Take Charge. She has been Member of Local Inquiry Committee of Jai Hind College for 10 years and also a Deputy Chairperson of TAF. She has been a Member of IQAC and Research Co-ordinator for NAAC.



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