



STUDY OF NOISE MONITORING IN KOLHAPUR CITY

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INTRODUCTION:

Noise is derived from the Latin word “nausea” implying unwanted sound or sound that is loud, unpleasant or unexpected. In other words, noise can be defined as wrong sound, in the wrong place, at the wrong time. The noise originates from human activities, especially the urbanization and the development of transport and industry. Though, the urban population is much more affected by such pollution, however small town/ village alongside roads or industries are also victim of this problem. Noise is found almost everywhere, not just in factories. Thunder is perhaps the loudest natural sound we hear; it sometimes reaches the threshold of discomfort. Jet aircraft take-offs are often louder to the listener. Some industrial locations have even louder continuous noise. Community noise is largely produced by transportation sources most often airplanes and highway vehicles. Noise sources are also in public buildings and residences. Noise pollution is become hazards to quality of life. It is found that even relatively low levels of noise affect human health adversely. It may cause hypertension, disrupt sleep, psychiatric disorder. That’s why it need to study the noise level and to monitor it.

The movement against noise pollution is weak in India. Most of the people do not consider it as a pollutant, and take it as a part of routine life. Of late, it has been recognized as a pollutant. In India, the Noise Pollution (Regulation and Control) Rules, 2000 have been framed under the Environment (Protection) Act, 1986. These are a set of guidelines for regulation and control of noise. A survey by the Central Pollution Control Board (CPCB) shows that in Delhi the noise level in most places are exceeds the permissible limit.

Evidently, noise pollution has assumed alarming proportions affecting adversely the efficiency of various population mental health and general quality of life. Moreover, it is becoming a problem of law and order with the growing number of complaints to police and administration unless and until, measures are taken to control the level of noise the ongoing urbanization and industrialization may complicate the problem much that it becomes incurable.

The present study indicates that the noise level in Kolhapur city during festivals increased more than the previous years' noise level was above the limits decided by CPCB India for urban area. Noise can adversely affect general health and well-being in the same manner as chronic stress. Noise pollution is a result of human misbehaviour all over the world. Though the subject is unseen we observed many people who have got severely affected not only physical health problems but also emotional and behaviour changes due to constant influences of noise. It is observed the way noise levels are increasing during these festivals. It seems we enjoy the sound. Though it has harmful effects on human health and environment. Therefore, the topic of noise monitoring of Kolhapur city during festival was chosen for the present study

OBJECTIVES:

1. To study the noise level in Kolhapur city.
2. To find out the noise level during different festivals in Kolhapur city.
3. To study the noise level with zone wise as per CPCB (Central Pollution Control Board) India's standard

STUDY AREA:

The research work was carried out at Kolhapur city under the Kolhapur district of Maharashtra state. Which close to Konkan coast which is connected by 12 Ghats going through Western Ghats like Anuskura, Amba, Phonda, Amboli, Bavada and Shivgarh etc. Kolhapur city is situated on the bank of perennial river Panchganga. Kolhapur is one of the major fast growing urban centre in Maharashtra state. As per the 2011 Census of India Kolhapur city has ground

5,49,283 population. Following location in Kolhapur city are studied during survey which classified in different zones as shown in the table no.1

Table No 1: List of sites of in Kolhapur city

Sr. No	Zone			
	Residential	Commercial	Silent	Industrial
1	Rajarampuri	Rajarampuri	C.P. R	Y.P.Powar Nagar
2	ShivajiVidyapith	Shahupuri	Court	Udyam Nagar
3	Uttareshwar	Laxmipuri	Collector Office	
4	MangalwarPeth	Mahadwar Road		
5	Tarabai Park	Gujari Corner		
6	Nagala Park	PapachiTikati		
7		BinkhambiMandir		
		MirajkarTikati		
		Gangawesh		
		BinduChowk		

Source: Field Work 2019

MATERIAL AND METHODS:

Measurement of Noise:

Generally Sound Level Meter (AZ6921) is an instrument used for measurement of sound (noise). These instrument measures the sound in approximately same way as human ear perceives it i.e. in terms of pressure difference. It is sensitive to sound pressure between about 20.000 Hz. It operates over a total range of about 30 dB to 140 dB sound pressure level. Generally Sound Level Meter measures some sound level meters as linear Sound Pressure Level (SPL). The instrument used for this project is directly measure the sound in terms of Leq.

The Sound can be classified on a Disable scale according to their loudness. The decibel (dB) scale is used to measure sound level. Mathematically, the sound

pressure Level (SPL) or loudness is equal to, Disable the range of sound pressure in a logarithmic scale is convenient; the unit of SPL is the dB, described by

$$\text{SPL} = 20 \text{ LOG}_{10} (P/P_{\text{ref}}) \text{ dB} \dots\dots (1)$$

Where P is measured sound pressure, and Pref is the reference pressure ordinarily used. The customary reference pressure is 0.0002 dynes/cm². (One standard atmosphere is equal to 1,013,250 microbars so 1 microbar is nearly 1 dyne/cm². The reference level should always be stated when sound pressure levels are given, as dB are 0.0002 dynes/cm².)

Sound power – the acoustic power produced by a source is described in watts. Again a logarithmic scale is used to accommodate the wide range involved, without in – conveniently clumsy figure. The unit again is the dB The PWL is expressed by

$$\text{PLW} = 10 \text{ LOG}_{10} (W/W_{\text{ref}}) \text{ or } 10 \log_{10} (w_{10-12}) \text{ dB} \dots\dots (2)$$

Where W is the acoustic power in watts, and W ref is the reference level which should always be stated; the reference level ordinarily used 10-12 Watt. Since the power ratio 10-12 can also be written as 120 dB, Equation (3) is convenient to write as:

$$\text{PWL} = 10 \text{ LOG}_{10} W + 120 \text{ dB re } 10^{-10} \text{ watt} \dots\dots (3)$$

Formula:

$$\square \text{ Leq} = 10 \log_{10}^n \sum_{i=1} f_i 10^{L_i/10}$$

Where,

Leq. = log equivalent

n = no. of class

f_i = frequency or no. of observation

L_i = mid value

Sound pressure sound power values are physical magnitudes, expressed in physical Terms. SPLs are ratio (the ratio of a measured value to a reference) expressed in logarithmic terms called dB another terms and quantities used in noise control work will be defined as they are used. Sound pressure and sound power are basic. The ear responds to sound pressure waves, and nearly all sound magnitude measurements are in terms of sound pressure. Sound power

determines the total noise produced by a machine and, thus, is important in machine design.

Noise Standards:

The noise pollution (Regulation and control) Rules, 2000 was notified by Ministry of Environment and forest, New Delhi on 14th February, 2000. As per schedule annexed to the Rules, the ambient air quality standard in respect of noise for different areas/ zones shall be as follows.

CPCB Standards		
Zone	Day Time (dB)	Night Time (dB)
Industrial	75	70
Commercial	65	55
Residential	55	45
Silent	50	40

The limit in dB denotes the time – weighted average of the level of sound in decibels on Scale A which is relatable to human hearing. Source: Environment (Protection) Act, 1986 as amended in 2002.

OBSERVATIONS:

The noise levels recorded at selected locations in Kolhapur city during the locations wise average values of noise values of noise. The result obtained from the study clearly indicate that noise level in selected localities under the study during festival season are much higher than that of the proscribed limits. The following results carried out the analysis of data collected during festival season (Diwali, Ganeshtosav, Navratri). The Amit Sharma, Dheeraj Tiwari and R.K. Bhatia (2008) have reported that the noise level of Jabalpur city are very higher than proscribed limit on central pollution control board in Navratri festival. This can causes negative impact on public health and welfare. Noise interferes in complex task performance, modified social behaviour and causes annoyance. The noise level mostly exceeding the permissible limits during the working days in the six metropolitan cities of Maharashtra. It is observed in report on ambient noise level monitoring of metro cities on 2008 under the Maharashtra Pollution

Control Board. The most common source of noise at all locations was dhol, banjo and puneridhol. The crowd for the Ganesh idol immersion which in turn increased the traffic have also contributed to the increase in the noise level. It is mentioned in the Maharashtra Pollution Control Board report on Ambient Noise level During Ganesh Festival 2008. Rajiv Hanshal and Yogesh Patil have reported the environmental noise pollution in Kolhapur city, Maharashtra are the hearing effects of a noise that intense enough are noise induced permanent threshold, noise induced threshold shift, and acoustic trauma. Usually these effects are accompanied by tinnitus (Singh and Davar 2004).

Table No: 2 Noise Level in the Kolhapur City (in dB)

Zone	Sites	Normal Day		Gokul Ashtami		Ganesh Chaturthi		Anant Chaturthi	
		Day	Night	Day	Night	Day	Night	Day	Night
Residential	Rajarampuri	62.19	54.33	68.37	60.31	67.14	59.05	56.72	54.28
	ShivajiPeth	65.82	62.56	66.72	59.56	68.06	65.08	65.38	68.11
	Uttareshwar	65.44	61.33	67.44	61.65	93.51	84.17	67.49	68.37
	MangalwarPeth	68.08	61.85	71.08	64.85	76.61	68.55	69.21	66.44
	Tarabai Park	63.84	60.78	69.84	65.78	72.19	65.74	55.83	55.69
	Nagala Park	66.83	55.96	67.83	62.96	55.43	51.48	58.91	54.29
Commercial	Rajarampuri	70.12	61.52	74.94	70.52	70.31	76.26	75.67	80.43
	Shahupuri	67.81	60.03	74.16	67.03	92.6	72.13	81.08	85.37
	Laxmipuri	69.38	63.31	72.81	69.31	75.86	69.07	78.89	88.47
	Mahadwar Road	70.98	65.33	78.49	67.03	82.15	71.15	80.03	85.06
	Gujari Corner	69.03	64.27	79.04	69.27	90.14	76.18	87.6	91.59
	PapachiTikati	68.91	60.84	73.91	68.47	81.83	74.89	74.35	71.05
	BinkhambiMandir	70.87	59.21	73.87	61.87	84.81	77.91	68.13	72.67
	MirajkarTikati	68.19	64.38	78.06	66.38	75.83	67.73	67.51	64.51
	Gangawesh	67.49	63.46	75.49	63.46	87.9	82.4	76.09	83.64
	BinduChowk	68.15	65.57	76.15	68.57	80.59	75.13	74.87	72.09
Silent	C.P. R	65.43	56.76	76.43	69.76	64.44	59.17	62.38	56.14
	Court	60.86	54.63	64.86	57.63	67.68	61.27	54.91	52.71
	Collector Office	64.44	58.35	69.44	62.35	65.43	58.63	56.47	62.36
Industrial	Y.P.Powar Nagar	69.94	64.19	70.94	62.19	70.58	64.74	69.56	59.74
	Udyam Nagar	70.58	66.61	74.58	67.61	73.67	69.31	64.73	61.58

Table No: 2 Noise Level in the Kolhapur City (in dB)

Zone	Sites	Ghatasthapna		Dasara		Dhanotrayodashi		Laxmi Pujan	
		Day	Night	Day	Night	Day	Night	Day	Night
Residential	Rajarampuri	65.51	59.94	69.51	58.69	69.71	60.27	66.51	60.31
	ShivajiPeth	66.72	59.16	68.62	56.34	70.15	57.48	68.72	59.56
	Uttareshwar	68.44	61.35	69.64	58.23	72.22	61.20	65.44	61.65
	MangalwarPeth	71.08	60.81	70.16	60.41	69.83	60.58	71.08	64.85
	Tarabai Park	66.84	60.48	67.55	51.65	71.55	57.21	67.84	65.78
	Nagala Park	65.53	58.89	65.91	54.16	69.29	56.12	65.83	62.96
Commercial	Rajarampuri	78.06	63.52	70.42	59.26	70.35	61.75	74.12	65.52
	Shahupuri	75.37	61.03	68.87	61.08	71.22	62.40	75.37	67.03
	Laxmipuri	70.41	64.37	72.61	57.29	73.42	63.98	72.81	68.31
	Mahadwar Road	77.98	64.13	75.48	58.45	72.48	65.36	77.98	67.33
	Gujari Corner	77.03	66.01	76.63	59.56	69.85	60.21	78.03	66.27
	PapachiTikati	76.91	69.04	73.41	59.80	72.65	62.25	74.91	68.84
	BinkhambiMandir	71.15	65.28	69.67	60.24	70.98	61.58	71.87	67.21
	MirajkarTikati	71.74	63.88	70.59	58.35	69.45	57.45	72.19	64.38
	Gangawesh	67.49	61.36	71.40	57.12	74.85	61.30	75.49	66.46
	BinduChowk	70.25	63.57	70.16	62.52	71.30	57.26	76.15	68.57
Silent	C.P. R	67.43	56.76	69.13	58.67	68.25	57.18	65.43	59.76
	Court	63.47	50.42	68.79	57.80	70.41	56.32	63.86	57.63
	Collector Office	66.31	49.35	65.36	52.77	71.29	59.64	66.44	62.35
Industrial	Y.P.Powar Nagar	69.94	58.37	70.52	53.44	70.42	58.61	70.94	70.19
	Udyam Nagar	70.58	56.12	69.64	58.35	71.29	63.48	72.58	69.61

Table No: 2 Noise Level in the Kolhapur City (in dB)

Zone	Sites	Diwali Padwa		Bhaubij	
		Day	Night	Day	Night
Residential	Rajarampuri	68.66	57.10	69.68	59.98
	ShivajiPeth	74.68	63.90	68.71	60.75
	Uttareshwar	72.28	62.18	64.06	57.18
	MangalwarPeth	70.39	59.20	65.07	59.15
	Tarabai Park	67.11	56.70	68.36	58.54
	Nagala Park	66.91	58.35	65.18	56.10
Commercial	Rajarampuri	72.41	62.12	69.41	65.38
	Shahupuri	68.21	62.88	67.21	61.12
	Laxmipuri	73.58	61.80	68.71	60.16
	Mahadwar Road	72.51	58.35	70.11	66.70
	Gujari Corner	70.09	61.87	68.49	59.66
	PapachiTikati	71.18	60.70	69.57	63.11
	BinkhambiMandir	70.80	60.79	68.11	61.20
	MirajkarTikati	68.45	58.12	67.28	58.36
	Gangawesh	74.30	60.21	66.91	60.27
	BinduChowk	71.18	61.70	67.33	62.51
	Silent	C.P. R	69.96	60.34	65.21
Court		68.02	61.45	60.26	56.33
Collector Office		70.58	57.10	62.80	63.38
Industrial	Y.P.Powar Nagar	67.54	58.61	67.18	58.61
	Udyam Nagar	69.35	60.42	69.27	60.42

Source: Field Work Data 2019 (Note: Day Time: 09 AM, Night Time: 12PM)

Ganesh Festival:

The Ganesh festival widely celebrated in Kolhapur city. Maximum noise level was 93.51dB in UttarashewarPeth. It was observed in day time. Minimum noise level 55.43dB was observed in Nagala park residential area at day time. In case of night time the minimum noise level 84.17 in Uttarashewarpeth and minimum level is 46.94dB Shivaji University at night time. Both are residential
Ajay Goud, Shubhangi M. Gavade & Dr. Kiran P. Shinde

and silent zone. The last day is AnantChaturthi of Ganesh festival. The 87.60dB was maximum level observed in PapachiTikti area and minimum level 54.91dB observed in court area at day time. In night time, maximum level 91.59dB was observed in PapachiTikti area and minimum noise level was 52.89dB in Shivaji University.

Navratri festival:

Ghatasthapna is the first day of Navratri festival maximum noise level was 78.06dB observed in Rajarampuri commercial zone and minimum level 54.76dB in Shivaji University at day time. In night time minimum level 49.35dB and maximum noise level 69.04dB. It was observed in collector Office and PapachiTikti area. Last day of Navratri festival is Dasara. This time maximum noise level 76.63dB in Gujari Corner. In night time highest noise level 62.52dB was observed in Binduchouk,

Diwali festival:

Diwali is an important hindu festival. It is widely celebrated in Indian tradition. It first day of Diwali is Vasubaras and Dhanyotradashi. On 25 Oct. 2019, maximum and minimum noise level 74.85dB and 60.48dB was observed in Gangawesh. In night time maximum noise level 65.30dB and minimum 50.15 was observed in Mahadwar road. On 27 Oct. 2019 Gujari Corner observed reading maximum was 78.03 and minimum reading observed in court area 63.86dB at day time. Maximum level 70.19dB in Y P Powar Nagar. During Diwali Padwa on 28 Oct. 2019 maximum noise level is 74.68dB and minimum noise level 60.51dB was observed in day time. The minimum noise level 51.20 dB and 63.90 dB maximum level was observed in night time.

RESULT, CONCLUSION & SUGGESTION:

RESULT:

The data computed for 22 selected areas of Kolhapur city is divided into 4 zones (Industrial, Silent, Commercial and Residential) as per the CPCB guidelines and surveys. Some of the most important festivals of Kolhapur city

like other than the traditional in Indian festivals like Diwali, Ganeshotsav, Navratri. All festivals widely celebrated across Maharashtra, but Kolhapur add unique zing to the event. It was observed the highest value for all selected areas varied markedly. It could be already seen that the highest noise level 93.51 dB in Ganesh Chaturthi. It was observed in residential area during time 9.00 am to 6.00 pm at day time. The maximum noise level was observed in Diwali and Ganeshotsav and minimum noise level was observed in Navratri and other festivals. It was increased by the 28.07dB as compared to the normal day's noise level. Similarly, the lowest noise level was 54.75 in Navratri Festival.

In time highest noise level is 84.17dB of Ganshotsav festival in residential zone during time 10.00 pm to 6.00 am. It was increased by 22.84dB as compared to normal days. The lowest noise level is 49.35dB of silent zone in Navratri festival during time 10.00 pm to 6.00 am at time. It was decreased by the 8.36dB as compared to normal day. Sometime noise level was decreased in festivals season. E.g. in silent zone noise level was decreased by 3.36dB as compared to the normal day, in night time. Some as Commercial zone in Diwali festival.

CONCLUSION:

Ganeshtosav and Diwali are two main noisy festivals in Kolhapur city which above the permissible noise level above CPCB limit within the city boundary. In Diwali and Ganeshtosav noise level is high residential and commercial zone. Some time in festivals season, noise level decreased in silent zone. Industrial noise level is high; this noise level was above the CPCB limits in normal day. The main source of noise is sound systems noise and huge loud speaker during in Diwali, Ganeshtosav and Navratri. The noise level on the day of Janata Curfew is low as compared to other working days due to the total closure of all the dealation, traffic. Therefore, there is a need for increased awareness among people including the Government officials to prevent the long-term health risks associated with noise pollution. Sometime noise was decreased by the 13.85dB in Navratri festival. It was observed in silent zone. In festival season Noise level was increased in residential and commercial area as compared to the Normal day and CPCB limits.

SUGGESTIONS:

Considering the present trend and future prospects of Kolhapur city, it is imperative for the government and the local authorities to take necessary steps or actions to save people from the menace of noise pollution. Some of the preventive steps in Kolhapur city, which can be taken by the government or regulatory agency are:

1. Improvement and proper maintenance of road conditions which will smoothen the flow of traffic.
2. Enforcement to ban the use of horns in silence area or zones as well as restriction of horns by vehicles when passing by residential areas.
3. Ban on use of heavy vehicles in commercial and residential areas during day time or diversion of traffic to minimize noise pollution.
4. Intensive plantation in open spaces, near residential and industrial places.
5. Periodic noise inspection on roads.
6. Noise impact assessment for any new or additional projects before granting the approval.
7. Proper enforcement of already existing legislation to control noise pollution.
8. Creating awareness among the masses through environmental workshops, campaign, mass media, press, radio, TV, newspaper, etc.
9. Recognition of the right of the citizens to enjoy noise free environment through some constitutional guarantee.
10. Declaration of noise as an offence on personal liberty and healthy living.
11. Prescribe volume pitch level for loudspeakers at; religious places. Processions/ public gathering and festivals.
12. Appoint inspectors in local bodies for mounting check on noise proliferation due to social activities.
13. Ban industrial and noisy trades/ works in residential areas.

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