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Acoustic Features of Balurghat Town South Dinajpur, West Bengal

SUKANTA MAJUMDAR AND ARCHAN BHATTACHARYA

Department of Botany, APC Roy Government College
Siliguri 734010, India

Abstract

Balurghat town is the headquarter of South Dinajpur district (West Bengal), coordinates of the town are 25°13´N and 88°46´E to 25.22°N and 88.76°E. The present work was undertaken to evaluate sound levels in the town during different periods of day time (sonic profile). From the study, four sound level category zones were recognized, viz. high sound level category zone two (H_2SLCZ, sound range : ≥ 80 dB), high sound level category zone one (H_1SLCZ, sound range : 70—79 dB), medium sound level category zone (MSLCZ, sound range : 60—69 dB) and low sound level category zone (LSLCZ, sound range : ≤ 59 dB). It is found that except Khadimpur Master Para region, in all places sound levels lie near or above the permissible limit (64—95 dB or above). Balurghat main bus stand and collectorate more are the victim of most stringent noise pollution. Thus acoustic situation in Balurghat is adverse to public health, so sound levels must be checked through various technological methods and legal measures.
Key words : Noise pollution, Sound level category zones, Silence zone.

Balurghat town is the headquarter of South Dinajpur district, coordinates are 25°13´N and 88°46´E to 25.22°N and 88.76°E. According to 2001 India census, Balurghat had a population of 135,516. It has an average elevation of 25 metres (1). River Atreyee runs across the city. It is well-connected by road to Maldah, Siliguri, Kolkata, Raiganj and other premier cities in North Bengal. The railway line to Balurghat commences at Eklakhi (distance from Balurghat ~79 km) Junction Station in Maldah district. The district of West Dinajpur came into existence in August 1947 with the partition on Bengal, it was further bifurcated in 1992 into Uttat (North) Dinajpur and Dakshin (South) Dinajpur districts (1). Noise (from Latin *nausea*) pollution is a form of air pollution that implies unwanted sounds with a mixture of many tones in a non-musical manner dumped into the atmosphere leading to health hazards (2) such as hearing impairment, threshold shift, cardiovascular and gastrointestinal problems, neurological disorders, sleep interference, fatigue, tension, annoyance, reduced efficiency. Noise of 90—120 dB corresponds with heath hazards and 140 dB is the threshold pain. The present work was undertaken to evaluate sound levels (acoustic features) at different points in Balurghat town during different periods of the day time to develop a sonic profile (i.e a document of noise level at different places

Table 1. Sound profile in Balurghat town. dBs—deciBells, unit of sound measurement; ** – sites with more than one mode.

Location	Time	Sound level (dBs) Min	Max	Mode
1. Khadimpur	6 am	40	70	47
Master Para	10 am	44	70	58
(Control)	2 pm	42	76	56
	4 pm	43	64	53
	6 pm	43	76	48
2. Khudiram	6 am	44	75	55
More	10 am	47	93	61
	2 pm	44	91	63
	4 pm	54	97	64
	6 pm	45	93	63
3. Hutkhola	6 am	43	82	55
(Saheb	10 am	55	96	65
Kachhari)	2 pm	50	89	64
	4 pm	54	78	61
	6 pm	54	98	64
4. Dunlop More	6 am	45	89	59
	10 am	57	100	73
	2 pm	54	98	68
	4 pm	56	89	71
	6 pm	46	98	70

Table 1. Continued.

Location	Time	Sound level (dBs) Min	Max	Mode
5. $3^1/_2$ No. More	6 am	49	84	55
	10 am	59	100	70
	2 pm	43	102	60
	4 pm	58	96	61
	6 pm	58	100	71
6. Main Bus Stand	6 am	56	110	71
	10 am	64	101	75, 80**
	2 pm	61	92	75
	4 pm	64	90	74
	6 pm	65	95	74
7. Collectorate More (Balurghat Girls' School)	6 am	49	84	67
	10 am	60	100	72
	2 pm	45	101	70
	4 pm	60	98	65, 71 **
	6 pm	59	99	69, 74 **
8. Chak Bhrigu Bus Stand More	6 am	46	100	47
	10 am	57	100	71
	2 pm	51	97	57, 61 **
	4 pm	55	90	57, 59 **
	6 pm	56	99	69
9. Balurghat College More	6 am	44	89	60
	10 am	57	97	70, 71 **
	2 pm	53	97	66
	4 pm	58	93	60, 63 **
	6 pm	59	95	73
10. Sadar (District) Hospital	6 am	54	95	62
	10 am	56	106	71
	2 pm	57	96	66
	4 pm	56	93	62
	6 pm	55	97	60, 64, 70 **

on different specific times) of the city that would be helpful to take administrative measures to save people. In West Bengal, similar noise survey was performed in Bardhaman town (3).

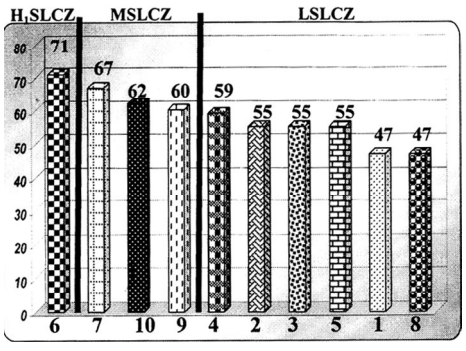

Figure 1. Sound levels at 6 am.

Table 2. Permissible noise level according to Environmental Protection Rules, 1986 (Schedule III). Source : Tripathy (2).

Area code	Type of area	Limits (dB) Day time	Night time
A	Industrial area	75	70
B	Commercial area	65	55
C	Residential area	55	45
D	Silence zone	50	40

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Methods

In Balurghat town noise data were recorded at various important points during a period of 4 minutes with the interval of 10 seconds on some specified time viz. around 6 am, 10 am, 2 pm, 4 pm and 6 pm. To measure noise, a Mini Sound Level Meter (Metravi SL-4010, accuracy ± 1.5 dB) was used to evaluate sound pressures in deciBells (dBs). For present work, the C weighting network was adopted.

Results and Discussion

The noise data collected from various important points of Balurghat town at specified times are shown

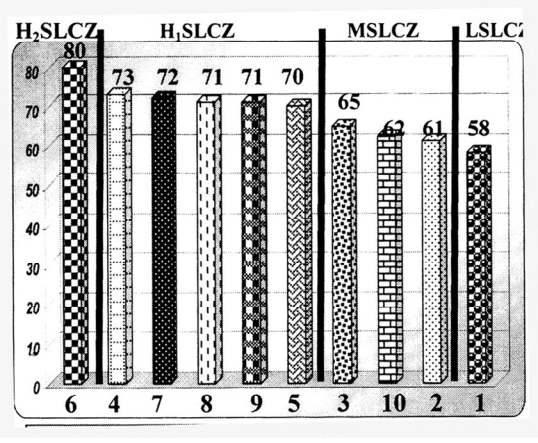

Figure 2. Sound levels at 10 am.

Table 3. Different sound level category zones in Balurghat town.

	Sound level (dBs)	Sound level category zone	Remarks	Location
1	≥ 80	High Sound Level Category Zone Two (H_2SLCZ)	Corresponds to industrial area	Site 6 at 10 am
2	79—70	High Sound Level Category Zone One (H_1SLCZ)		6,7
3	69—60	Moderate Sound Level Category Zone (MSLCZ)	Corresponds to commercial area	2,3
4	≤ 59	Low Sound Level Category Zone (LSLCZ)	Ideal for residential area (control)	1

in Table 1. Minimal, mximal and modal values have been noted. It is seen that most of the places are much noisy around 10 am and 4 pm as those are office hours. Depending on maximum and minimum values, it may be concluded that main bus stand and collectorate more are the victim of most stringent noise pollution (near or more than 70 dB). This is normal because main bus stand is the entrance into and exit from this district town while the collectorate more is surrounded by Balurghat police station, Girls' High School, museum, DM office and other district offices, banks. Except these zones the town is more or less homogeneous regarding level of noise pollution. There is another exception also, i.e. Khadimpur master para–this is a cool and calm place. In reference to noise pollution, the place may be regarded as 'control' or natural environment with minimum anthropogenic sonic interference. The piece results from absence of traffic.

Figures 1 to 5 show the sound levels in different sites of the town at specified times. Athough maximum sound levels in an area indicate the stringency of pollution as well as the acute acoustic situation and these values are required to take remedial measures, modal values indicate the overall noise property and chronic acoustic situation in a site. So, modal values have been used in Figures from 1 to 5. Some sites, viz. Main bus stand, collectorate more, Chak Bhrigu bus stand, Balurghat College more and sadar (district) hospital more show dual or trio modes, in such cases the highest mode has been considered as frequency of noise is directly proportional to acoustic fatigue.

In each figure, modal values have been arranged in descending order on Y axis; X axis denotes locations. On top of each bar the value indicates the modal value. From these figures, four sound level category zones could be recognized, viz. high sound level category zone two (H_2SLCZ, sound range : ≥ 80 dB), high sound level category zone one (H_1SLCZ, sound range : 70—79 dB), medium sound level category zone (MSLCZ, sound range : 60—59 dB) and low sound

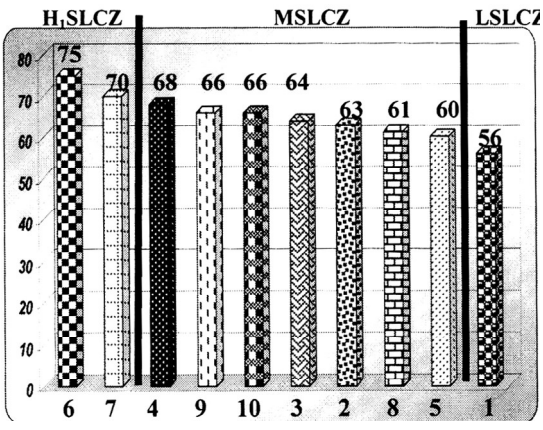

Figure 3. Sound levels at 2 pm.

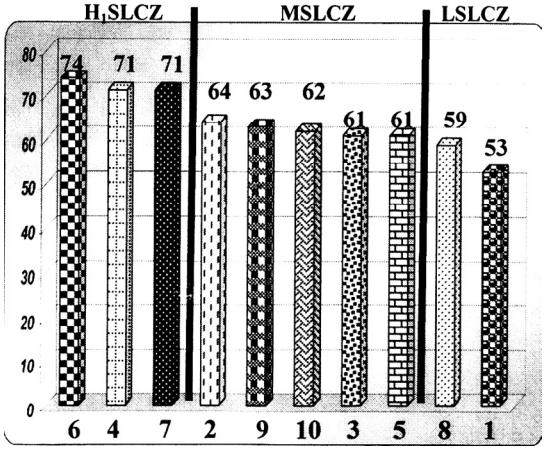

Figure 4. Sound levels at 4 pm.

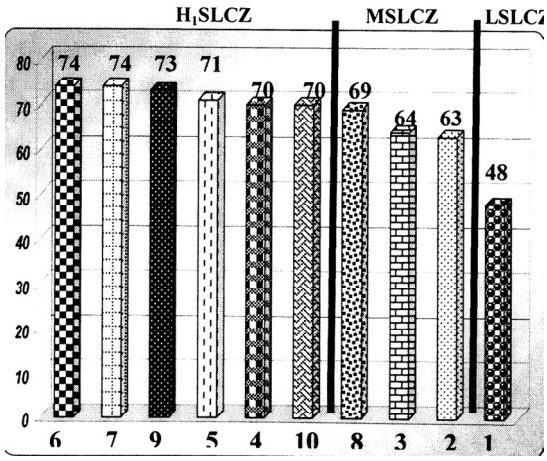

Figure 5. Sound levels at 6 pm

level category zone (LSLCZ, sound range : ≤ 69 dB) (Table 2). Among the sites, 4, 5, 8, 9 and 10 show less fidelity to any category; sites 5 and 8 tend to fall in lower sound level categories (SLC), while sites 4, 9 and 10 tend to be included in higher SLC. Table 3 shows the permissible noise level according to Environmental Protection Rules, 1986 (Schedule III) and the correspondence of the sound level category zones of Balurghat town to the type specified by the Protection Rules (1986). It is seen that zones H_2SLCZ and H_1SLCZ correspond to industrial area while zones MSLCZ and LSLCZ correspond to commercial and residential areas respectively. Interestingly, H_2SLCZ is virtually absent in Balurghat, onle site 6 (main bus stand) enters into the category only at 0010 hours. As Balurghat harbours population, some measures should be taken for acoustic welfare of the people such as maintenance of silence zone 100 m around the premises of sadar hospital, colleges and schools; introduction of unidirectional roads near main bus and sadar hospital, stringent traffic control near main bus stand and collectorate more, shifting of autostand from main bus stand, construction of noise absorbing tree belt (of native trees such as neem, ashok, mahogony) along roads, use of ear muffs among schhol going children legal measures also might be taken if necessary.

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