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Analyzing the Impact of High-Intensity Adhaan Sound Created by Amplifiers on the Children Playing at Fields Adjacent to Mosques at Dhaka, Bangladesh

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ABSTRACT

A man in his voice calls for prayer at parts of the world where there are practicing Muslims, known as 'Adhaan'. The sound of Adhaan has a spiritual mandate to make people assert themselves in prayer. Dhaka is known as the city of mosques. Like many other Muslim residing parts of the world, for Adhaan, loudspeakers are also being used in Dhaka. The high-intensity sound of direct amplifiers often rises beyond acceptable public noise standard and destroys the serenity of Adhaan. As there is a mosque in almost every 500 footsteps at Dhaka, Adhaan sounds of different mosques overlap. In this paper, 4 mosques from different residential areas have been taken which are adjacent to children's playing fields. The intensity of 'Magrib Adhaan' (the evening prayer call) sound has been measured with a sound-level meter. The research has identified whether the Adhaan sound is within the acceptable limit and has addressed the vulnerability of being exposed to high-intensity sound on children. The study can help to make decisions about the use of amplifiers for Adhaan and can support people to sense the serenity of Adhaan.

INTRODUCTION

Adhaan' is a cultural and historic sound for the Muslim community. After hearing the sound, they comprise themselves in prayer (Figure 01). Every Adhaan tells the times of the day; 'Fazr (Dawn), Dhuhr (Midday), Asr (afternoon), Maghrib (sunset), Isha (night); these are the five Adhaan times. People who listen to Adhaan, connect

differently due to their individual background. However, for muslim community, it is a holy acoustic event. Dhaka, the capital of Bangladesh, 90% inhabitants are muslims here. (Wikipedia report 2019, December 22). According to a 2008 survey of the Islamic Foundation, there were 5,776 mosques in Dhaka alone. (Dhakatribune report, 2019, December 25)



Figure 1: Some praying muslims
(Source: <https://www.flickr.com/photos/80948451@N08/17008203395>; retrieved 5th January, 2020)



Figure 2: The onventional loudspeakers used for Adhaan.
(Source: <https://hinduexistence.org/2018/08/15/>; retrieved 5th January, 2020)

Theoretical Framework

Dhaka is known as the city of mosques. So, Adhaan is a common acoustical event here. But how much the intensity of Adhaan sound should be, that has never been analyzed in this context.

Private and public sounds

Sounds of large volume encompass large spaces and transcend the borders between the private and the public sphere. The central quality of public sounds is that they can and are in general also meant to be heard in the public accessible space, whether by location or by volume. Thus, even if they are individually experienced, they are social

events in the sense of the 'acoustic community' and are subject to evaluative processes which legitimate their presence in the public space. (Fennes N. 2012, January 1)

The Islamic Soundscape:

An Islamic soundscape must be regarded as being integrally involved in subject-formation processes. At its most basic, the Islamic soundscape as machinery recruits people within hearing distance as certain categories of inhabitant-subjects (residents, visitors, etc.). The call to prayer, or adhan in Arabic, is critical: as a physical act of calling a community of believers (umma), its significance in demarcating a Muslim community's territory is

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constantly at the forefront. (Andrew J. Eisenberg. 2013).

Comparison of observed rate of sounds in Yokohama, Japan and Muscat, Oman

According to one research, religious calls are heard by 80 percent of people in Muscat but only approximately 30 percent of people in Yokohama. Because this cry is duplicated via loudspeakers, Azan is commonly heard throughout Muscat. Bells as religious summoning devices are rarely heard in Yokohama since they are rarely utilized. [5]. So, ‘Adhaan’ is a prominent element of soundscape in Muslim community, whereas other religious calls are not that prominent. So, it is worth working in this field so that ‘the call’ can be considered a positive soundscape element.

The allowable Noise level

From the Bangladesh National Building Code (BNBC), we can get an idea about the allowable upper limit of outdoor noise levels (Table 1).

Table 1: Allowable upper limit of outdoor noise levels

| Category of Zones | Upper limit of noise in dBA LAeq,T | |
|-------------------|------------------------------------|------------------------------|
| | Day Time (6.00 am-9.00 pm) | Night Time (9.00 pm-6.00 am) |
| Quiet zone | 50 | 40 |
| Residential zone | 55 | 45 |
| Mixed use zone | 60 | 50 |
| Commercial zone | 70 | 60 |
| Industrial zone | 75 | 70 |

Source: Bangladesh National Building Code, Volume 3, Appendix H, Table 8.H.1

Speech reinforcement approaches: Central Arrays versus Distributed Systems

The central array and the spread array are two ways of speech reinforcement. A central array is used to cover a large area from a single location. A Distributed system, on the other hand, has several loudspeakers, each covering only a tiny piece of the listening area. (John M. Eargle. 1997)

METHODOLOGY

The study has been conducted by measuring the ‘Magrib Adhaan’ intensity of 4 mosques adjacent to which children play. As, the probability of the children of being exposed to ‘Magrib Adhaan’ is more than any other times.

Study Area

The selected fields and adjacent mosques are (Figure 03):

- I. Shahid Hazi Alim Eidgah field and Shah Saiyad Miskin Ashraf Jame mosque at Old Dhaka.
- II. Khilkhet Nikunja-2 Jame Mosque and field at Khilkhet Nikunja-2, Dhaka
- III. aitul Al jame Mosque beside Uttara Sector 7 park

at Uttara, Dhaka.

IV. Uttara Central Mosque and Sector 4 Playground at Uttara, Dhaka

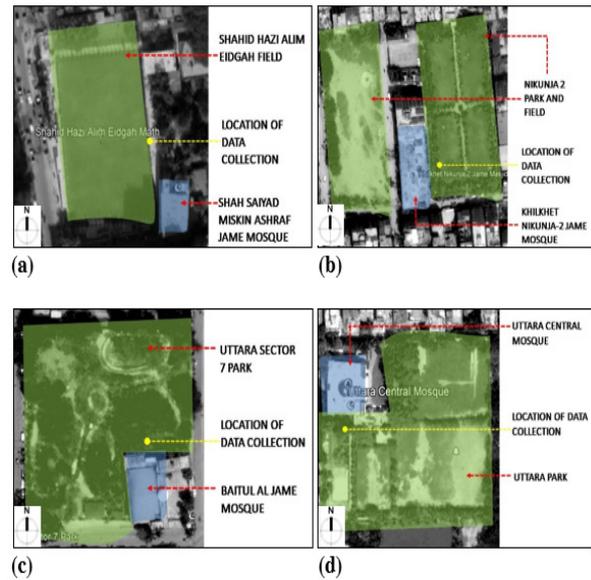


Figure 3: Location of the fields, mosques and data recording points on google map.

- (a) Shahid Hazi Alim Eidgah Field (source: Google Earth 23°43’17.85”N 90°23’21.98”E)
- (b) Nikunja 2 park (source: Google Earth 23°49’50.69”N 90°25’05.79”E)
- (c) Uttara sector 7 park (source: Google Earth 23°52’12.36”N 90°23’49.86”E)
- (d) Uttara Sector 4 playground (source: Google Earth 23°51’40.44”N 90°24’12.16”E)

Methods of data collection

A data logger type sound level meter has been used to collect the sound intensity during the Adhaan. The meter was positioned at the nearest possible location of the mosques. The highest peak has been recorded during Adhaan. The average level of background noise has been noted. The type of amplification whether direct or distributed, was also been observed.

Times of data collection

The data was collected 30th December and 31st December of 2019 and 1st January, 2nd January and 3rd January 2020 consecutively at the 5 mosques during Magrib Adhaan (5.20 pm-5.25 pm). Before starting the Adhaan, the background sound was also been measured to know the present noise level.

Methods of analysis

A chart has been generated mentioning the type of amplification and the intensity found and the data has been compared with the standard upper-level for outdoor noise in residential zone as all the mosques are in residential areas.

STUDY RESULT AND ANALYSIS



Figure 4: Some photographs during the survey work at Shahid Hazi Alim Eidgah Field



Figure 5: Some photographs during the survey work at Khilkhet, Nikunja 2 Playground



Figure 6: Some photographs during the survey work at Uttara Sector 7 park



Figure 7: Some photographs during the survey work at Uttara Sector 4 Playground

After collecting the data from the mentioned locations (Figure 04, Figure 05, Figure 06, Figure 07), now we can produce a chart, comparing the found data with the standard (Table 02).

Table 02: Comparing the found data with standard

| Name of the mosque | Loudspeaker type (Direct or Distributed) | Background noise level (dB) | Sound level(dB) during Adhaan | Difference from background noise | Difference from standard noise level (55dB) |
|---------------------------------------|--|-----------------------------|-------------------------------|----------------------------------|---|
| Shah Saiyad Miskin Ashraf Jame Mosque | Direct | 67.5 | 83.5 | 16 | 28.5 |
| Khilkhet Nikunja-2 Jame Mosque | Direct | 67.8 | 113.6 | 45.8 | 58.6 |
| Baitul Al jame Mosque | Direct | 59.2 | 88.5 | 29.3 | 33.5 |
| Uttara Central Mosque | Both | 58.4 | 95.0 | 36.6 | 40.0 |

CONCLUSION AND RECOMMENDATIONS

It is not ethical to let someone’s faith strike on someone else on a very loud note and allowing the holy acoustical event ‘Adhaan’ to contribute to the noise pollution. It is found from the survey that, the sound level during the Adhaan time is much higher than the acceptable limit. Even 113.6

dB found at Khilkhet Nikunja-2 Jame Mosque. Exposure to sounds at or above 85 decibels can cause hearing loss. (hearsmart report 2019) Instead of using direct loudspeakers, distributed speaker system with less intense sound can help this situation and can make children listening to it sense the serenity of this regular acoustical event.

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