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Research Article

# A Study on the influence of Deepavali festival on noise level in Chidambaram town, Tamilnadu, India

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***Abstract***

*The present paper deals with monitoring of noise pollution in different places of Chidambaram town on the Deepavali festival. During the present study the noise levels were measured with the help of sound meter. A preliminary assessment of noise levels during Deepavali, pre Deepavali and post Deepavali was made in the present study. Noise monitoring was carried out in the daytime (06.00am to 10.00p. am) and night time (10.00p. m to 06.00a.m.) of Deepawali festival. Deepawali or Diwali is an important Hindu Festival. It is the festival of lights that comes in the month of October or early November. On this occasion, a lot of firecrackers are used almost in every part of the country. This causes not only air pollution, but noise pollution also. Noise pollution monitoring during the Diwali Festival has been carried out on 2nd November 2013 during the night time. Noise levels were recorded at 30 sites in Chidambaram. The sites are divided into 3 zones based on their locations. The survey included areas around hospitals, residential and commercial areas. Noise levels were compared with standards prescribed by the Central Pollution Control Board, India. On Diwali day the maximum noise levels ranged between 61 dB(A) to 103 dB(A), while on the pre-Diwali night the maximum noise levels ranged between 60 dB(A) to 100 dB(A) .The minimum noise levels during the day ranged between 46.5 and 80.5 dB(A) , while on the pre-Diwali night the minimum noise levels ranged between 54 dB(A) to 85 dB(A).The highest noise levels on Diwali night was recorded at East car Street station which was 103 dB(A). More than three sites showed values of 101 dB (A) in the study on Diwali night, which were Annamalai Nagar Station, Kothankudi street and S. P. Koil street. On Diwali day and night noise is consistently high, although the noise is sporadic. All the sites showed noise values above permissible limits.*

***Keywords:*** *Deepavali festival, Noise pollution, Firecrackers, Health hazards, Sound Level, Ambient air quality standard*

## 1. Introduction

Noise is an unwanted sound that may cause some psychological and physical stress to the living as well as non-living objects exposed to it (Singh and Davar, 2004). The increasing numbers of vehicles, musical instruments, small scale industries, urbanization and human activities are the main source of noise pollution (Gangwar et,al. 2006**).** Deepawali is an important Hindu festival, in which a lot of crackers are used almost in every part of the country. This causes a lot of noise and air pollution. (Kudesia and Tiwari, 1994**).** The crackers contain dangerous chemicals including arsenic, sulphur, magnesium, iron dust, aluminium dust etc. that are harmful and cause bronchitis, asthma, eye ailment, headache and nervous system problems in human beings while birds and animals have to cope with the blasts and toxic smoke. (Kudesia, 2007). The focus is to reduce noise and sound pollution that is intense during the festival days (Pawar and Joshi, 2005). India and all other countries are facing this environmental problem for a long period. Noise from fire cracker is one of the most important environmental problems. Mainly fire crackers are used on festive occasions in India and other countries.

A large amount of firecrackers is used on Deepawali festival. We should also discourage the use of fire crackers as child labour is employed in their manufacturing. Now Deepawali is celebrated with colors, flowers, sweets and Rangoli in India, U.K., Nepal, France, Pakistan, Malaysia, Canada, Sri Lanka and Germany. Besides Deepawali there are also other festivals during which Noise and Air pollution is observed. (Kudesia, 2005).

The word Pollution has been derived from the Latin word *'Pollutionem'* (meaning to defile or make dirty). Pollutant is a substance, the presence of which causes pollution. The pollutants reach us through the air we breathe, the water we drink, the food we eat and the sound we hear1. Noise is the term given to the sound (produced by vibration in air or other medium) which becomes loud, or disagreeable, or unwanted. Since the unwanted sound (i.e. Noise) certainly produces several undesirable effects on our body health, it is termed as an environmental pollutant. The Air (Prevention and Control of Pollution) Act 1981 added noise as one of the air pollutants. So noise

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pollution may be defined as unwanted sound, which gets disposed of into the environment without monitoring its adverse effect on a living being.

Noise pollution is a significant environmental problem in many urban areas that has not been properly recognized despite the fact that it is steadily growing in developing countries (Jamrah et al, 2006). At present, noise pollution is considered as one of the key problems of urban communities that has numerous hazardous effects on the urban environment and may result in a great deal of costs on the society. (Martin et al., 2006; Chien&Chien, 2007). There is no question that noise is both a public health hazard and an environmental pollutant as well. It is present in every classified as either occupational noise, i.e. noise in the workplace, or as environmental noise, which includes noise in all other settings, whether at the community, residential or domestic level when assessing its impact on human well-being (Concha-Barrientos et al., 2004). Vehicles, musical instruments, small scale industries, urbanization and human activities are the main sources of noise pollution. (Gangwar, 2006).Traffic noise levels increase with increasing density of traffic composition, the road slope, width and surface structure distance to cross road. (Williams and McCrae, 1995). Studies have also attributed vehicular noise pollution to large scale migration, increase in the number of vehicles (Escap, 1990), traffic jams, defective roads and vehicles and above all the human factor which in our society is reflected by inherent impatience under social pressures giving rise to such acts as blowing of horns unnecessarily. (Sharikh and Rizvi, 1990; SEPA, 1994; Ahmad, 1994; Mehdi et al., 2002; Dev and Singh, 2011.) These attributes are well pronounced during festive periods.

### *1.1. Sources of noise*

The anthropogenic activities mainly the development of transport and the urban and industry are the source of origin of the noise. The outdoor noise sources dominating worldwide are mainly construction and transportation systems, including aircraft noise, rail noise and motor vehicle noise (Noise Pollution and Abatement Act of 1972). The chief causes of noise generated from traffic are the exhaust systems and motors of automobiles.

**A. Transportation Noise:** The Chief source of urban and community noise are mainly motor vehicles and aircrafts. Railway machinery has a high noise output, but bring about less annoyance than either air traffic or road traffic.

**B. Urban Noise:** The urban noise distribution patterns are quite complex and differ from city to city; yet, in the general source of origin remains common. A noise base exists twenty-four hours per day, consisting of noise from household appliances, heating and ventilating, ordinary atmospheric noises, and other low level noises. This noise base is usually of low, between 30 to 35dB3.

**C. Specific Noise Sources:**

Specific cases consist of noise sources which are characterized by either intense or widespread or unavoidable nature of noise. Building demolition and construction work require powerful blows and large forces and are often carried out in congested urban locations3. Silence Zone is a zone having schools, colleges, banks, parks and hospitals.

### *1.2. Harmful effects of noise*

Noise is considered a serious threat to the environmental health. Some of the adverse effects of noise pollution are given below:

a. It interferes with speech. In the presence of noise we may not able to follow, what the other person is saying.

b. Noise leads to emotional and behavioural stress. A person may feel disturbed by the presence of loud noise such as produced by heating of drums.

c. Noise may permanently damage hearing. A sudden loud noise can cause severe damage to the eardrum.

d. Noise increases the chances of occurrence of diseases such as headache, blood pressure, heart failure, etc.

e. Noise leads to increased heart beat, constriction of blood vessels and dilation of the pupil.

f. Noise is a problem, especially for patients who need rest.

g. Noise may cause damage to liver, brain and heart.

h. It creates annoyance to the receptors due to sound level fluctuations. The periodic sound due to its irregular occurrences causes displeasure of hearing and causes annoyance.

i. The physiological features like breathing amplitude, blood pressure, heart-beat rate, pulse rate, blood cholesterol is affected.

j. The working performance of workers/human will be affected as they will be losing their concentration.

k. It causes pain, ringing in the ears, feeling of tiredness, thereby affecting the functioning of human systems.

l. It affects the sleeping there by inducing the people to become restless and lose concentration and presence of mind during their activities

m. The buildings and materials may get damaged by exposure to infrasonic / ultrasonic waves and even get collapsed.

## 2. Previous work

Study of noise pollution in Kolhapur city, India during Deepawali festival showed an average noise level of 74.24 dB (A), 62.52 dB (A), 58.88 dB (A), and 50.02 dB (A) at industrial, commercial, residential and silent zones respectively. The result showed that there was an enhanced pressure of noise at all sites due to increase in number of vehicles and facilities of transportation. All the sites under study showed a higher sound level than the prescribed limits of the Central Pollution Control Board (CPCB). **(Mangalekar et al., 2012).**

Noise levels of ten sites were found to be above permissible limits during Diwali festival weeks in Sangamner city in Maharashtra. The noise level was higher in the morning and evening, but lower at noon. Pre-Diwali showed 0.1% to 20.6%, Diwali revealed 2.7% and post-Diwali showed 0.4% to20. 3% higher sound level limit. The combination of various types of vehicular noise was found to be minimum 70.2 (0.3% higher) and

maximum 90.0 (29% higher). The contributions of individual levels were found to be more than the traffic noise limit of 70dB (A) and varied from vehicle to vehicle **(Dhembare et al, 1999).**

The blowing of horns increased alarmingly and was up to 30 - 35 dB (A) above the tolerance limits in Karachi, the largest city in Pakistan (SEPA, 1994). The most noticeable sources of noise pollution here are the auto rickshaws, trail motorbikes and fog horns of public transports **(Zaidi, 1990).**

The problem caused by noise pollution is more aggravated during celebration, festival, marriage or religious functions **(Vijayalakshmi et al., 2003)**. Noise from fire crackers is one of the most important environmental problems, mainly during festive occasions.

Noise pollution is a silent killer problem growing day-by-day. A definite solution to it has not been yet developed, because the health effect due to noise pollution has not paid much attention like other pollutions. It has become an unjustifiable interferences and imposition upon human health **(Little, 1962;Gopalkrishan 1978; Lakshimipathi, 1978)**, comfort and qualitative of human life **(Gorai and Pal, 2006)**. To meet the demand of good wealth and health services of over increasing population, that noise and traffic have become busy and hence there is always incidence of noise population in urban areas.

## 3. Materials and Methods

The level of Noise Pollution is monitored at different places of the Chidambaram town in the daytime (06.00am to 10.00p. am) and night time (10.00p. m to 06.00a.m.) of Deepawali festival. For this purpose three zones i.e. Commercial Zone, Residential Zone and Silence Zone were selected within the town. The noise levels were monitored with the help of sound level meter (YF-20 Made in Taiwan) during pre-Diwali, Diwali and post Diwali days. It is a compact and portable instrument designed against JIS dB (A) specification. It has a range of 40–80 dB (Low-value scale) and 80-120 dB (High value scale). This meter is provided with ON-OFF switch, battery check, calibration Low-Scale, Hi-Scale. The reading was taken by holding the instrument 100–150 cm above the ground level for site of specific timings.

For this purpose 22 locations comprising Residential zone (viz. Annamalai Nagar, Mud road, Thiruvetkalam, Muthiah Nagar, KRM Nagar, Mariyappa Nagar, Kothankudi street, Gandhi Nagar, Indira Nagar, Kanaga Sabai Nagar, Omakulam, Siva Sakthi Nagar, Nataraja Puram, State bank colony, Raja Nagar, Mannargudi street, Radhavilagam, Otta Nagar, Sivapuri, Kamaleeswaran Koil street, Min Nagar and

Kaasukadi Street.), 6 locations comprising Commercial zone (viz. S.P.Koil Street, East car street, west car street, north car street, south car street and Ammapet.) and 2 locations comprising Silence zones(viz. Government Hospital and Medical college.). The standards of noise level were compared with that of the standards prescribed in Environmental Protection Rules**,** 1986 and standards of

CPCB (Tripathy, 1999). According to recommended noise standards, the maximum limit for noise level in Silence Zone during the day is 50dB and in the night is 40dB5.Table 1 shows that the Ambient Air Quality Standards in respect of Noise

**Table 1.** Environmental noise standards as prescribed by the Central Pollution Control Board (CPCB), New Delhi, India

| Area code | Type of area | Environmental noise standards (Leq) in dB(A) | |
|---|---|---|---|
| | | Day time | Night time |
| A | Industrial area | 75 | 65 |
| B | Commercial area | 65 | 55 |
| C | Residential area | 55 | 45 |
| D | Silence area | 50 | 40 |

## 4. Results and Discussion

The results were surprising in some Residential areas, particularly in Annamalai Nagar and Kothankudi Street where maximum crackers are burned. In Commercial Zone maximum sound level of 103 decibels is observed in East Car Street and in Residential Zone maximum sound level of 101 decibels is observed in Annamlai Nagar. In Silence Zone maximum sound level of 90 decibels is observed at the Medical College. Figure 1shows that the Average noise level (Residential area) in dB (A) during Deepavali day.

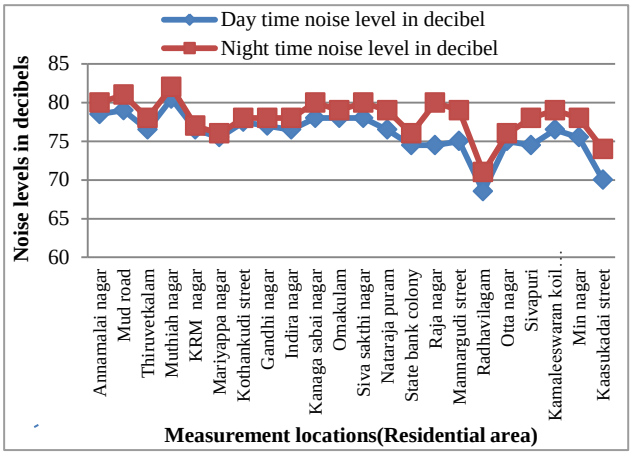


**Figure 2** Average noise level (Residential area) in dB (A) during Deepavali.

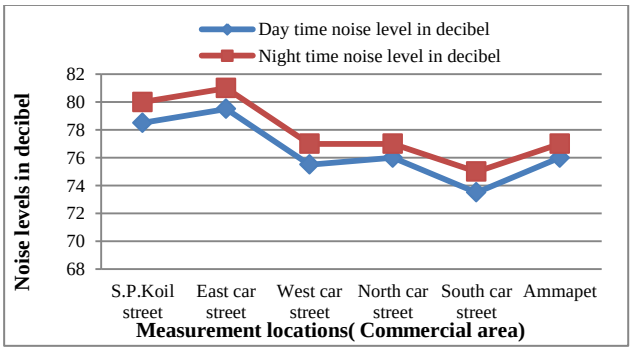


**Figure 2**Average noise level (Commercial Area) in dB (A) during Deepavali.

Figure 2 shows that the Average noise level (Commercial Area) in dB (A) during Deepavali. Figure 3 shows that the Average noise level Silence Area) in dB (A) during Deepavali day.

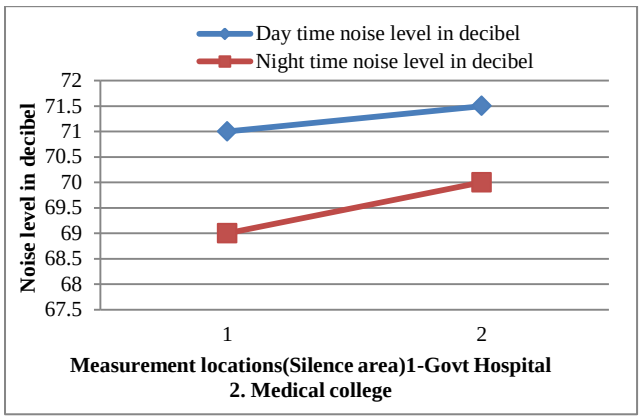


**Figure 3** Average noise level (Silence Area) in dB (A) during Deepavali.

Figure 4 depicts that the ambient noise levels on Deepavali day are far higher than the pre- Deepavali day values at all sites. In some cases the noise levels have been exceeded 90dB (A) which is considered to be harmful for physiological well being of people.

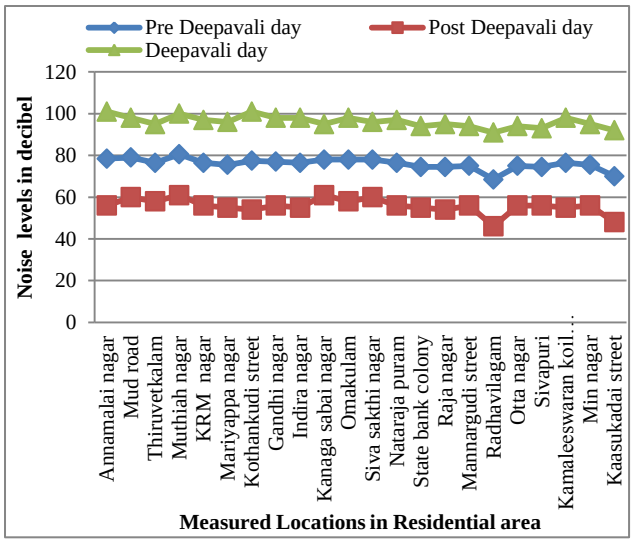


**Figure 4** Noise level on Pre-Deepavali, Deepavali and Post Deepavali day at different localities of Chidambaram.

Figure 5 depicts that the ambient noise levels on Deepavali day are far higher than the pre- Deepavali day and post-Deepavali day values at all sites.

Another interesting observation was higher levels of noise on Deepavali day at Annamalai Nagar followed by Kothankudi street Muthiah Nagar Mud road, Indira Nagar, Kanaga Sabai Nagar**,** Omakulam, Kamaleeswaran Koil street Thiruvetkalam, KRM Nagar, Mariyappa Nagar, Gandhi Nagar, Siva Sakthi Nagar, Nataraja Puram, State bank colony, Raja Nagar, Mannargudi street, Radhavilagam, Otta Nagar, Sivapuri, Min Nagar and Kaasukadi Street, all these sites being suburbs of the town. This could be attributed to lower buffering of noise due to lesser number of trees as well as canyon effect.

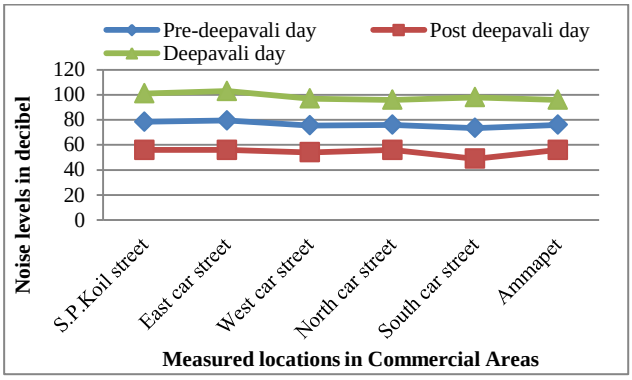


**Figure 5** Noise level on Pre-Deepavali, Deepavali and Post Deepavali day at different localities of Chidambaram.

## Conclusion

From the present Investigation it was concluded that Noise level of Annamalai Nagar, Kothangudi Street (Residential area) and East car street (Commercial area) is high as per Ambient Noise Standards. From the data it was also concluded that the Lnp was found to be high at Annamalai nagar, Kothangudi Street. So the Annamlai nagar, Kothangudi Street and East Car Street require Noise barriers like wall around these areas or develop green zone by planting trees. In this work the emphasis is given to highlight the rising levels of noise as one of the urbanization impacts of Chidambaram town. The following conclusions were obtained from our study. A maximum noise level of 103 dB is observed at Annamalai Nagar in the night time and minimum noise level of 46 dB is observed at Radhavilagam in the day time (Residential area). A maximum noise level of 103 dB is observed at East Car Street in the night time and minimum noise level of 49 dB is observed at South Car Street in the day time (Commercial area). It was understood clearly from our study that the noise levels are elevated in urban areas mainly because of Firecrackers. To protect the citizens from various adverse effects of urban noise, proper noise control measures are to be adopted.

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