Noise Pollution Monitoring Of Residential Areas In Kalaburagi City

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ABSTRACT

Traffic noise is a major problem in the urban and developed cities leading to health and hazardous pollution in the environment. To overcome the characteristic problem of noise pollution, measure of the noise pollution are crucial. Importance should be given to areas like bus stands, business areas (commercial), residential areas, and hospitals zones. The purpose of this research was to investigate the current state of noise pollution in the surrounding environment. Sound levels in Kalaburagi city were found at an avg of 56 dB, which is in the allowable limit, according to the study. This paper represents the participatory sensing and real time monitoring and analysis of noise pollution the kalaburagi city.

KEYWORDS:-Noise, Kalaburagi, Decibel, Sound Level Meter.

INTRODUCTION

Noise pollution may be defined as continuous exposure to the increased sound levels may cause health issues in humans and animals and living organisms in the environment. According to the World Health Organization, sound levels less than 70 dB are not harmful and does not cause damage to living organisms, regardless of the limit of exposure (in terms of hours). It might cause hazardous if the sound exposure exceeds the time limit of 8 hours to a constant noise more than 85 dB. If the person works continuous for 8 hours and beyond 8 hours daily in the area proximity to a heavy traffic road or highway, they are very likely exposed to traffic noise around 85dB.

OBJECTIVES

1.To monitor Noise pollution at various locations of Kalaburagi city.
2.To assess/know the Effects of Noise Pollution.
3.To examine ways to control (Suggestions) Noise Pollution.
4.Comparing the level of noise with CPCB standards

SOURCES

Transportation:

- Road traffic: Cars, trucks, motorcycles, and honking contribute to significant noise levels in urban areas.
- Air traffic: Aircraft noise from airports and flight paths, especially during takeoff and landing.
- Railways: Trains, including high-speed and freight trains, produce substantial noise, particularly near tracks and stations.
- Maritime traffic: Ships, boats, and port operations create noise pollution in coastal areas.
- Factories and plants: Machinery, generators, and production processes in industrial areas generate continuous noise.
- Construction sites: Activities like drilling, hammering, and the operation of heavy equipment cause noise pollution.
- Mining and quarrying: Explosions, drilling, and transport of materials in mining areas lead to high noise levels.

Natural Sources:

• Natural disasters: Earthquakes, volcanic eruptions, and thunderstorms create loud and disruptive sounds.
• Wildlife: In some areas, particularly near forests or coastlines, animals can contribute to noise pollution

Industrial Activities:

• Factories and manufacturing plants
• Construction sites (machinery, demolition)
• Mining and quarrying activities.

EFFECTS OF NOISE POLLUTION

Impacts of Noise on human and environment:-
1. Hearing Loss Chronic Exposure: Prolonged exposure to loud noise, especially in workplaces or urban areas, this can result in permanent hearing loss. Even everyday sounds like traffic, & construction, and loud music can contribute to this over time. Temporary Threshold Shift: Short-term exposure to loud noise can cause a temporary reduction in hearing, known as a temporary threshold shift, which can become permanent with repeated exposure.
2. Sleep Disturbances Noise pollution, especially during nighttime, can interfere with sleep patterns, making it harder to fall asleep & wake up a lot and overall poor sleep quality. Chronic sleep abnormalities have been linked to heart disease and cognitive decline, among other long term health issues.
3. Mental Health Impacts Noise pollution is correlated with higher levels of tension, anxiety, and irritation. It can furthermore contribute to severe mental health problems like depression and cognitive impairment, especially in patients as the are sensitive to noise or already have pre-existing conditions

LITERATURE REVIEW

1.Krishna Murthy et al., "Assessment of Traffic Noise Pollution in Banepa, a Semi Urban Town Of Nepal"
Noise pollution is a significant air pollutant that can have adverse effects on hearing and overall health forth exposed .As there is no cure for hearing loss, prevention through avoiding excessive noise exposure is the best course of action.A study was conducted to measure community noise levels during the daytime in a rapidly developing semi-urban area of Nepal. Standard procedures and calibrated sound pressure level meters were used to measure noise levels in areas with both commercial and residential buildings in the town of Banepa, particularly focusing on areas prone to motor vehicle traffic. Additionally, a brief study was conducted to assess then is egenerated by different vehicles on the main roads.Tounderstand th ecommunity's perception of noise and its impacton health, arepresentative sampleofthe public was interviewed us in ga questionnaire.The results showed that noise levels often exceeded recommended limits. The minimum and maximum noise levels recorded on the main road were 60.1 dB (A) and 110.2 dB (A) respectively.

2.K. Rawat, V. K. Katiyar "Mathematical Modeling Environmental Noise Impact" Pratibha Indian Institue of Technology, Roorkee, India-247667. Exposure to noise can have a negative impact on health, leading to issues such as hearing damage, annoyance, and poor cardiovascular health. People living near highways are especially susceptible to the effects of community noise. To address this, a road traffic noise model has been developed to predict and mitigate noise exposure. Measurements along the Dehradun-Haridwar highway in Dehradun city have shown promising results, indicating the potential for this model to effectively predict the noise in Indian conditions and protect individuals from excessive environmental noise.

3.BhavenTandel, Dr. Joel Macwan, Pratik N. Ruparel "Urban Corridor Noise Pollution: The case profile of Surat city, India" they reported the issue of Traffic r noise pollution accounts for nearly 2/3rd of the total noise pollution in an urban locality.Traffic noise on existing urban area lowers the quality of life and property values near these urban corridors. Surat is now the tenth largest city of India having an estimated population of 40 lakhs plus at present. An inconceivable population growth rate of 76.02% was observed in the last decade as a result of rapid industrialization. Surat is well known as diamond city and is also famous for silk and jari industry.

4.Shadrach Tunde,Akinkaude, kowawole, Peter Fasae, “A Survey of Noise Pollution in AdoEkitietropolis Using

Mobile Phone," in Science Technology Department, Science Research Publishing, October 2015.
The pervasive nature of noise pollution makes it the most concerning among the city pollutants in Ado Ekiti metropolis, posing a serious urban crisis. In a study conducted in AdoEkiti, the capital town of Ekiti State, Nigeria, noise pollution was monitored at five different locations using a Sound Pressure Level mobile application installed on a mobile phone. The equivalent noise level using A-weighting was measured every fifteen minutes in each location between 6:00 am and 9:00 pm, and the LAeq,T of each location was calculated.

STUDY AREA

Kalaburagi, formerly known as Gulbarga, is a city in the Indian state of Karnataka. It is a significant city in the region due to its historical importance, cultural heritage,and growing urbanization. Here is a detailed over view of Kalaburagi, covering its residential, commercial, and industrial areas
According to the 2011 Census of India, Kalaburagi (previously known as Gulbarga) in Karnataka had the following key demographic details
Population: The total population of Kalaburagi district was approximately 2,564,892.This included 1,313,585 males and 1,251,307 females.
Urban Population: The urban population of Kalaburagi city was around 543,147.
Sex Ratio: The average sex ratio of Kalaburagi district was 952 females per 1,000 males, which was slightly lower than the Karnataka state average of 973.
Literacy Rate: The average literacy rate in Kalaburagi district was 64.85%. Male literacy was higher at 74.39%, while female literacy was 54.98%.
Child Population: The population of children aged 0-6 years in the district was around 391,202, which accounted for 15.25% of the total population.

Residential Area:
Kalaburagi has seen significant growth in its residential sectors due to urbanization and infrastructure development. Some prominent residential areas include
SEDAM ROAD (JAY NAGAR)
AWAIN-E-SHAHI
SEDAM ROAD (OM NAGAR)
SHAHBAD ROAD (PRASHANT COLONY)

I had been monitoring N.P at JAY NAGAR located near SEDAM ROAD.

Climate :- The climate of the kalaburagi district is always hot and dry,which influence the sound waves to travel faster.
Temperature:-The temperature in this region very high
Around an average temperature of 38$^{c.}$
Road conditions:-The roads in this region are generally mixed wherein most of the roads are narrow resulting in heavy and stationary traffic which inturn causes noise pollution.

METHODOLOY

The method to monitor the noise level involves using specialized equipment, such as sound level meter or digital decibel meter, to measure and to quantify the intensity of sound in a surrounding environment. I used the below instrument to measure the noise pollution in different areas in kalaburagi city.

About the Instrument:
To monitor the sound pollution, I used an instrument which is known as Decibel meter.
Sound Level Meter

Fig: Sound Level Meter

Sound Level Meter (SLM)
Sound level meter measures and displays the analog noise waveforms numerically. Sound Pressure Level, maximum sound level and minimum sound level etc. are displayed in decibels. Sound pressure 20 (μPa,microwavePascal) is set as a reference level. It consists of a frontend and a sensor. It is portable and easy to use.

Noise measurement
Power ON
Press the<POWER>button turn on the device. The device is in a suspended state.

Start measurement
Press the power button, The device will display the mode of starting measurements of sound in the surrounding. By pressing the “hold” button for 3 seconds the light of the device gets activated and the following readings are noted down.

Recording measurement
By pressing the power on button the readings of the surrounding noise levels gets displayed into the machine, the machine has a option of maximum and minimum button to know the max and min level of noise by pressing the maximum and minimum button and press the hold button to note down the value of the readings displayed in the device.

Toggle noise value display
A decibel meter is a measuring instrument used to assess sound or sound levels by measuring sound pressure. Often referred to as a sound pressure level (SPL) meter, decibel (dB) meter, sound meter or sound dosimeter.
A sound level meter uses a microphone to capture sound. The sound is then evaluated within the device and acoustic measurement values are displayed.
Our most advanced, yet easy to use a hand-held instrument decibel meter(sound level meter) for measuring the loudness both in real time as well as over time from anything from "silent fans" to rock concerts or in other situations. The device can be used to measure the sound level at a rock concert, in or beside schools, traffic or near airports.

READINGS

Variation in Noise Level in Residential Area At Morning
Noise level during morning hour's in (dB)

Days	Time	LA_{max}	LA_{min}	$LA_{max}+LA_{min}$
Day1	8:58 to9:08	71.39	39.47	55.43
Day2	9:10to9:20	89.22	37.59	63.45
Day3	8:58to9:00	72.57	45.19	58.88
Day4	9:00to9:10	66.50	40.88	53.69
Day5	9:10to9:20	69.39	39.47	54.43
Day6	9:10to9:20	65.67	38.29	51.98
Day7	8:58to9:00	66.43	42.25	54.34
Day8	9:00to9:10	68.39	39.43	53.91
TOTAL		71.19(avg)	40.32(avg)	55.76(avg)

Variation in Noise Level in Residential Area At Afternoon
Noise level during afternoon hour's in (dB)

Days	Time	LA_{max}	LA_{min}	$LA_{max}+LA_{min}$
Day1	14:00to 14:10	74.15	39.10	56.62
Day2	14:00to 14:10	62.08	37.51	49.62
Day3	13:58to 14:00	70.27	46.88	58.55
Day4	14:00to 14:10	79.26	43.49	61.37
Day5	14:10to 14:20	68.59	35.45	52.02
Day6	14:00to 14:10	66.73	34.58	50.65
Day7	14:10to 14:20	67.57	38.48	53.02
Day8	14:00to 14:10	66.13	36.28	51.20
TOTAL		72.56(avg)	38.97(avg)	54.13(avg)

Variation in Noise Level in Residential Area At evening
Noise level during evening hour's in (dB)

Days	Time	LA_{max}	LA_{min}	$LA_{max}+LA_{min(avg)}$
Day1	17:00to 17:10	69.83	40.97	55.4
Day2	17:00to 17:10	69.39	43.56	56.47
Day3	16:58to 17:00	70.92	42.11	56.51
Day4	17:00to 17:10	78.76	47.45	63.10
Day5	17:10to 17:20	67.54	35.86	51.7
Day6	17:00to 17:10	68.63	38.54	53.58
Day7	17:10to 17:20	65.63	40.48	53.05
Day8	17:00to 17:10	68.46	42.48	55.47
TOTAL		69.93(avg)	41.45(avg)	55.6(avg)

RESULT AND DISCUSSION

Identified different locations in kalaburagi city. The readings of the residential areas i had taken below
By monitoring the NP in residential areas in morning, afternoon & evening hours,I had observed the readings from the table which varies from day 1 to day 8. The minimum noise level by taking into account of morning, afternoon &

evening hours is 41.00dB and the maximum noise level of morning, afternoon & evening is 72.56dB and the average of both is 55.76dB, which is within the limits compared to CPCB Standards.

Monitoring of noise Level in Residential Area At Morning hours

Monitoring of noise Level in Residential Area At Afternoon hours

Monitoring of noise Level in Residential Area At Evening hours

CALCULATIONS :-

1. Avearge of LAmax = $\frac{\text{Total readings of LAmax}}{\text{Total number of days}}$

2. Average of LAmin = $\frac{\text{Total readings of LAmin}}{\text{Total number of days}}$

3. Average of LAmax+LAmin = $\frac{\text{Total readings of LAmax+LAmin}}{2}$

CONCLUSION

The study suggests that the noise pollution in the Residential area(Jay Nagar) of the kalaburagi city, the noise levels are within the limits of CPCB standards.

At the same time educating the people about the effects of the noise pollution is necessary and to create awareness to reduce it .

REFERENCES

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