



International Journal of Innovative Research in Science Engineering and Technology (IJIRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



Impact Factor: 8.699

Volume 14, Issue 8, August 2025

Noise Pollution Monitoring of Commercial and Industrial 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 74.71 dB, which is above 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, decible, Sound level meter.

I. 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.
- Industrial Activities:
 - 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 they are sensitive to noise or already have pre-existing conditions

II. 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 the noise generated by different vehicles on the main roads. To understand the community's perception of noise and its impact on health, a representative sample of the public was interviewed using a 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 Institute 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. Bhaven Tandel, Dr. Joel Macwan, Pratik N. Ruparel "Urban Corridor Noise Pollution: The case profile of Surat city, India" they reported the issue of Traffic 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 Ado Ekiti metropolis 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 Ado Ekiti, 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 overview 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.

COMMERCIAL AREA:

Kalaburagi has several commercial hubs that serve as the city's economic backbone. Some of the key commercial areas are:

SUPER MARKET CENTRAL BUS STAND SARDAR VALLABHBHAI PATEL MARKET

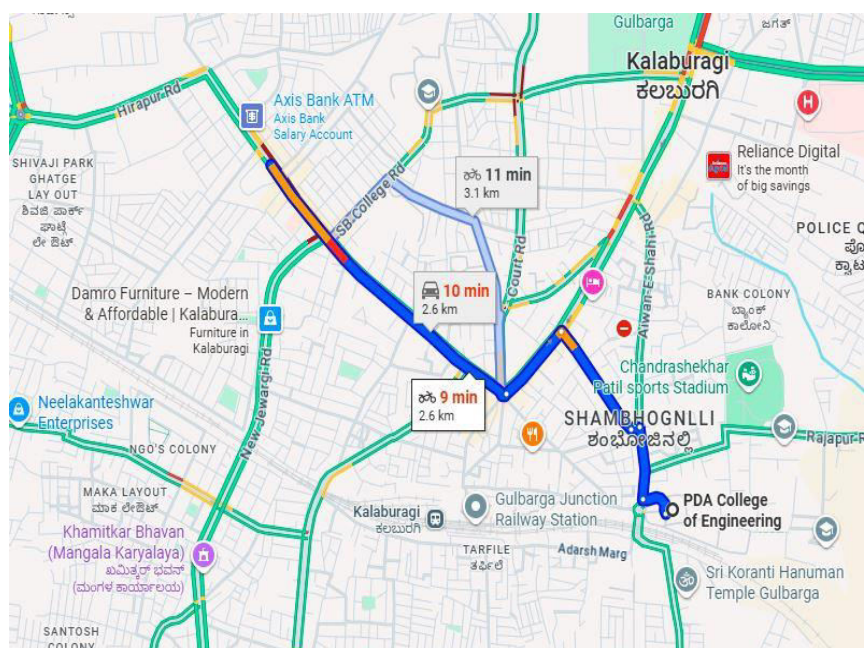


FIG NO.1 COMMERCIAL AREA

I had monitored Noise pollution at Kalaburagi Central Bus Stand, kalaburagi. Distance:- 2.6km from PDA college of Engineering, Kalaburagi. Pincode:- 585101

The main commercial hub in the city, central bus stand, is always bustling with activity of transportation and people around. Common problem in commercial areas, especially in urban areas. It can affect the comfort, productivity, and health of employees, tenants, and customers. In India, the permissible noise level in commercial areas is 65 decibels (dB) during the day & 55dB at night.

INDUSTRIAL AREA:

Kalaburagi has a growing industrial sector, primarily focused on cement production, textiles, and agro-based industries. Key industrial areas include :-

SEDAM ROAD INDUSTRIAL AREA(NANDUR) KAPNOOR INDUSTRIAL AREA

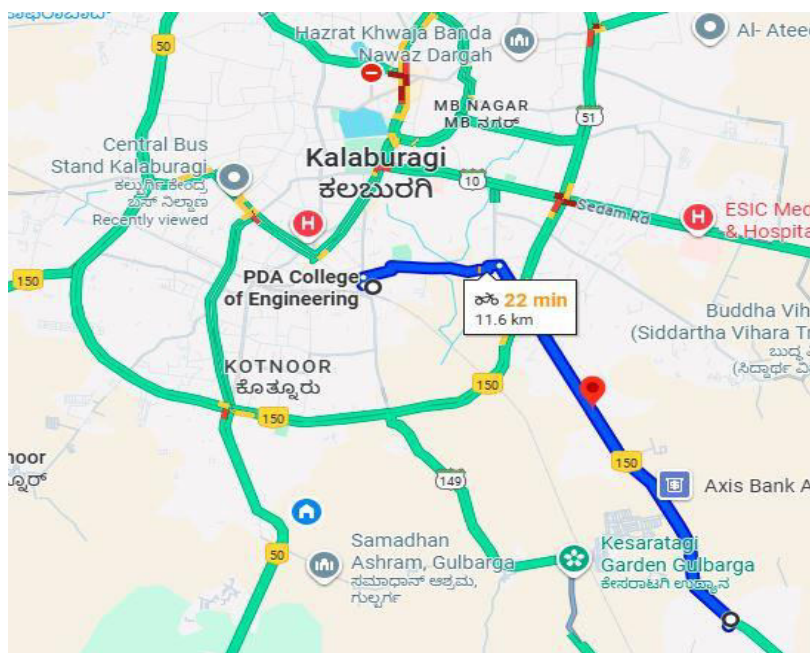


FIG NO.2 INDUSTRIAL AREA

I had monitored Noise Pollution in Nandur industries. It is located 13.2 Km towards east from dist head quarter Gulbarga Distance – 12 Km from PDA Pin Code – 585102

Industrial noise pollution is unwanted or excessive sound produced by industrial activities and processes. It may come from several sources such as machinery equipment, processes, and operations. Noise from industry is often loud, continuous, and high frequency, making it more damaging to human health and the environment. Some examples of industrial noise pollution include Pneumatic power tools like grinders and chippers molding machines like blow molding. Nandur industries includes paper, steel, cement industries etc.

The permissible level of noise is 75 dB in daytime & 70 dB in nighttime

III. 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 no 3. 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

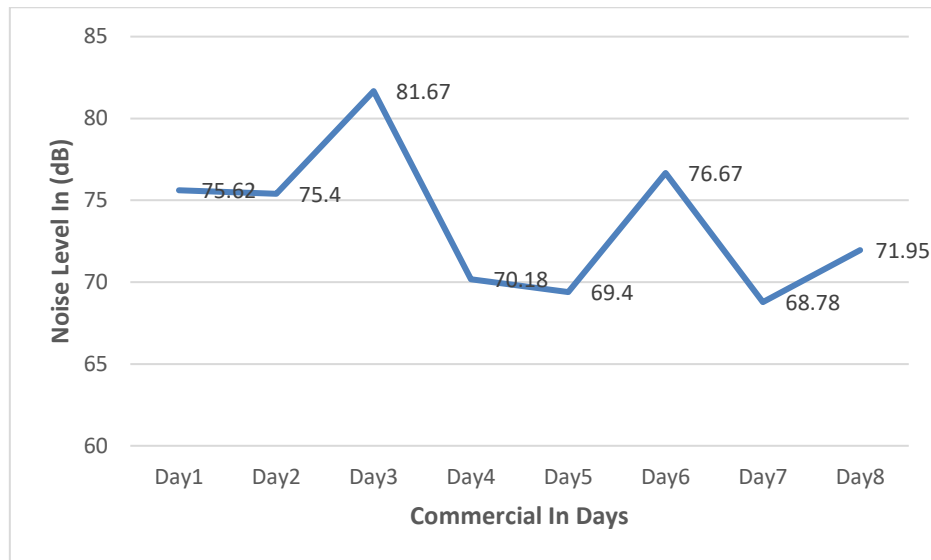
A decibel meter is a measuring instrument used to assess sound or sound levels by measuring sound pressure. Often referred to as a sound pressure level (SPL) meter, decibel (dB) meter, sound meter or sound dosimeter.

A sound level meter uses a microphone to capture sound. The sound is then evaluated within the device and acoustic measurement values are displayed.

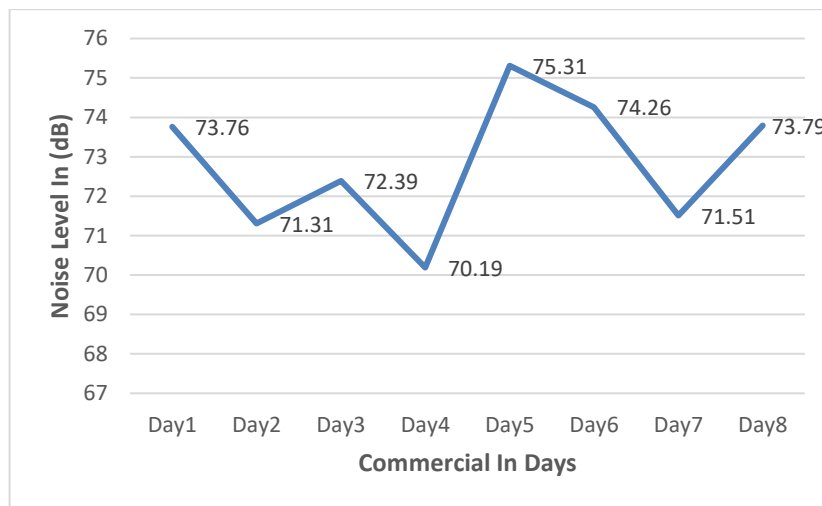
Our most advanced, yet easy to use a hand-held instrument decibel meter (sound level meter) for measuring the loudness both in real time as well as over time from anything from "silent fans" to rock concerts or in other situations. The device can be used to measure the sound level at a rock concert, in or beside schools, traffic or near airports.

READINGS:

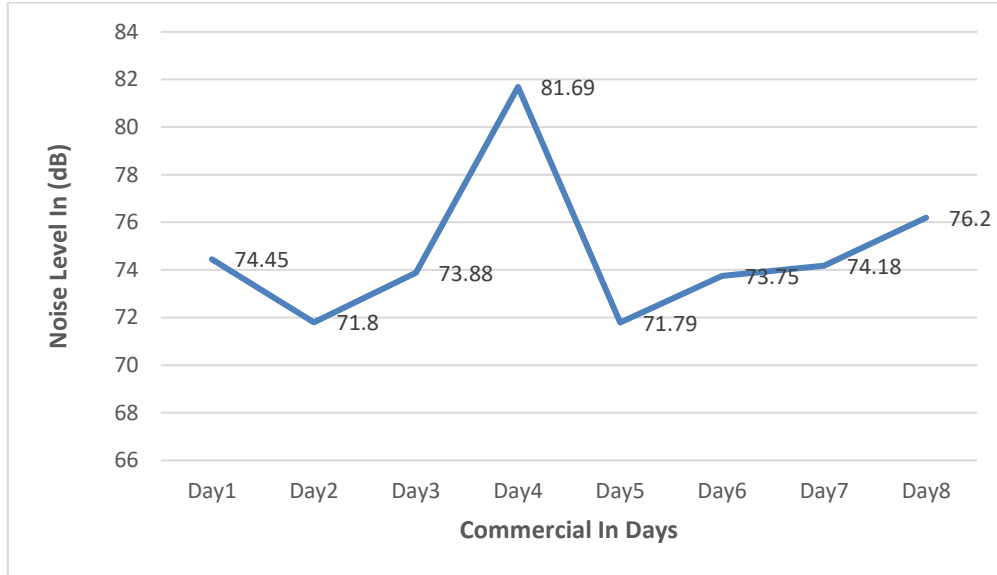
Variation in Noise Level in Commercial Area At Morning Noise level during morning hour's in (dB)



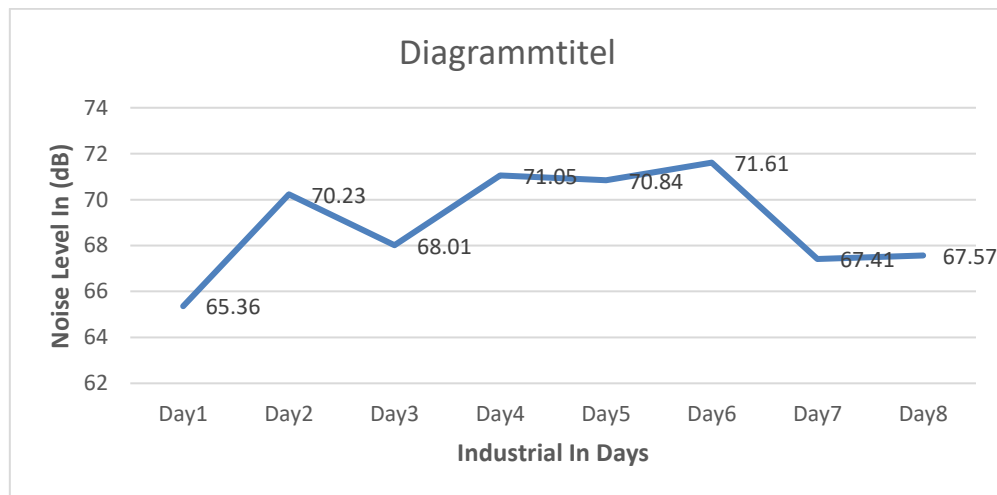
Variation in Noise Level in Commercial Area At Afternoon Noise level during afternoon hour's in (dB)



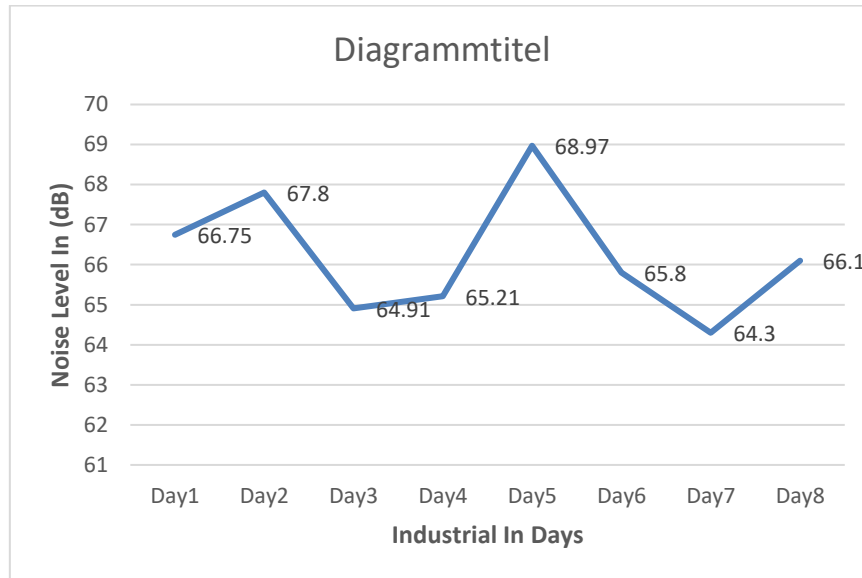
Variation in Noise Level in Commercial Area At evening Noise level during evening hour's in (dB)



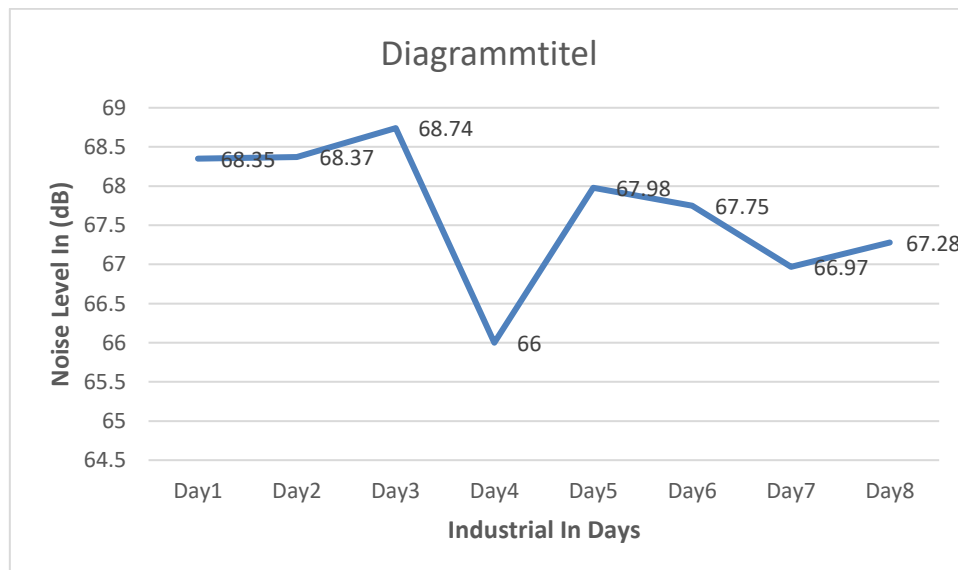
Variation in Noise Level in Industrial Area At Morning Noise level during morning hour's in (dB)



Variation in Noise Level in Industrial Area At Afternoon Noise level during afternoon hour's in (Db)



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



IV. RESULT AND DISCUSSION

Identified different locations in kalaburagi city. The readings of the Commercial and Industrial areas i had taken below By monitoring the NP in the 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 45.53dB and the maximum noise level of morning, afternoon & evening is 94.67dB and the average of both is 74.71dB, which exceeded the limits compared to CPCB Standards.

Figures showing the monitoring of noise levels in the commercial and industries



Fig no.7



Fig no.8



Fig no.9



Fig no.10

V. CONCLUSION

The study suggests that the noise pollution in the Commercial and Industrial areas of the kalaburagi city, the noise levels exceeded 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 .

The threat of noise pollution needs to be taken seriously. For this, the first step is to make people aware of various diseases caused by noise pollution. We should focus on using low noise emitting machines and equipment. From the noise map it is observed that noise exceeded the permissible values recommended by CPCB in Industrial and Commercial areas mainly during evening hours.

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- 1.KrishnaMurthyetal., "AssessmentofTrafficNoisePollutionInBanepa,ASemiUrban Town Of Nepal".
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