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Noise Pollution Monitoring In Kalaburgi City

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ABSTRACT

Traffic noise is now a major issue for city dwellers, leading to a host of health issues. To take this characteristic into consideration, measurements of noise characteristics are crucial, since it is very time dependent. Special consideration should be given to areas like bus stands, business districts, residential areas, and hospitals. People in the older age groups tend to experience greater levels of stress and poor sleep quality, which increases their risk. Due to its proximity to metropolitan areas, noise pollution in sensitive zones has also been on the rise, making it all the more important to regulate this issue. The purpose of this research was to determine the current state of noise pollution. Sound levels in Kalaburagi city were found to be 70 dB to 110 dB, which is about double the allowable limit, according to the study. Daytime levels of noise reached 118 dB, while nighttime levels dropped to 20.52 dB. A better domain requires noise management in sensitive zones, according to the review article.

Keywords: Noise Pollution, Decibel, Sound Level Meter

I.INTRODUCTION

1.1 GENERAL

The common understanding is that people and other living things are susceptible to the negative impacts of chronically high sound levels, which is called noise pollution. No amount of time or frequency exposure to noise below 70 dB is harmful to living things, says the World Health Organisation. Constant noise levels over 85 dB for more than 8 hours could be harmful. There is a good chance that you are exposed to 85 dB of traffic noise pollution if you work for eight hours a day near a highway or busy road. [1]

1.2 Sources of Noise Pollution:

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.
Urbanization:

Urban infrastructure: Power generators, air conditioners, and other machinery in densely populated areas.
Public spaces: Loudspeakers, public announcements, and events can increase noise levels in parks and squares.
Household Sources:
Appliances: Washing machines, vacuum cleaners, and kitchen gadgets contribute to indoor noise pollution.

Television and music systems: Loud media equipment in homes or from neighbors.
Pets: Continuous barking or other sounds from domestic animals.
Entertainment and Recreational Activities:

Nightclubs and bars: Loud music and crowds can create noise, especially in entertainment districts.
Sporting events: Stadiums and outdoor sports activities generate considerable noise.
Fireworks and celebrations: These can cause temporary but intense noise pollution.
Agricultural Activities:
Farm machinery: Tractors, harvesters, and other equipment produce noise in rural areas.
Animal husbandry: Noise from livestock, particularly in large farms.
Military Operations:
Training exercises: Explosions, gunfire, and aircraft in military zones can be sources of intense noise pollution. [2]

II. LITERATURE REVIEW

1. Krishna Murthy Sanjay Khanal., "Assessment of Traffic Noise Pollution in Banepa, a Semi Urban Town Of Nepal" [1]
An interfering air contaminant, noise has audiometry as well as a plethora of non-auditory impacts on the exposed population. Since there is currently no treatment for hearing loss, the only option is to take precautions to avoid being exposed to loud noises. The research details the daytime noise levels in a rapidly urbanising semi-urban region in Nepal. Several locations in Banepa town, including both business and residential tenements, had their noise levels tested using a calibrated sound pressure level metre in accordance with normal protocol. These locations reflected regions that are especially susceptible to motor vehicle activity. Additionally, a little exercise involving various automobiles often seen on arterial routes has been executed. Utilising a questionnaire, we polled a representative cross-section of the population to get their thoughts on the noise and its impact on community wellness. There was a lot of noise, with levels that were higher than what was required. A general guideline for the Main Road noise level is 60.1 dB (A) with a maximum of 110.2 dB (A).

2. T.Subramani, M.Kavitha, K.P.Sivaraj/ "Modeling Of Traffic Noise Pollution" International Journal of Engineering Research and Applications (DERA) ISSN: 2248-9622 www.ijera.com Vol. 2, Issue 3, May-Jun 2012, pp.3175-3182[2]
It is well-established that traffic noise is a substantial contributor to the total noise pollution issue. The noise pollution from roads is a major issue in the neighbourhoods around them, particularly during times of heavy traffic and fast speeds. Heavy and medium trucks and buses, as well as cars and two-wheelers, all add to the issue of vehicular traffic noise. Various prediction models based on L10, Leq, and other features have been created by many western nations. Both the number of automobiles on Indian roads and the transportation industry are expanding at a quick pace of 7.50 percent per year in India. Overcrowding on roadways and other forms of pollution are direct results of this. There are many forms of pollution, but one of the most common and harmful to humans is noise pollution. It is thus believed that a model for noise prediction that is well-suited to the circumstances of Indian roads is required.

3. Model GolmohammadiR. PhD, Abbaspour M. PhD, Nassiri P. PhD, Mahjub H. PhD "Road Traffic Noise" J Res Health Sci, Vol 7, No 1, pp. 13-17, 2007[5]

Models that can estimate noise level from basic factors have been developed in response to the realisation that road traffic noise is a major cause of environmental contamination. In order to better plan roadways, traffic noise prediction models are essential. The evaluation of current or future traffic noise situations also makes use of them sometimes. The purpose of this research is to forecast traffic noise in Iran using a statistical modelling technique. Located in western Iran, the city of Hamadan was the site of the research in 2005 and 2006. There were 282 noise measurements included in the dataset. We used regression analysis on the whole dataset to create a new model of the Iranian situation. In order to get a good match for the observed values of Leq (r2=0.913), the constructed model incorporates twelve explanatory variables.
The suggested model for road traffic noise may be used as a useful decision-support tool for forecasting the Leq(30min) traffic noise index in urban areas of Iran.

4. A.Hassan, J.B.Alam "Traffic Noise Levels at Different Locations in Dhaka City and Noise Modelling for Construction Equipments" International Journal of Engineering Research. www.ijera.com. Vol. 3, Issue 2, March-April 2013, pp.1032-1040 1032 |
Page no [3].
Fast economic development in a developing nation like Bangladesh is impossible without first constructing an appropriate infrastructure. For a megacity like Dhaka, noise pollution is a big issue. Dhaka is now hosting a massive civil-structured project called the Jatrabari-Gulistan flyover. The primary goal of this research was to document and evaluate the noise levels at significant locations, including major junctions in the study region and important institutions like hospitals, schools, and places of worship, during all hours of the day and night. At the Jatrabari junction, the average noise level was 92.7 dBA during the construction period and 86.6 dBA during the regular period.

5. D. Banerjeel, S. K. Chakraborty2, S. Bhattacharyya3 and A. Gangopadhyay4 "Evaluation And Analysis Of Road Traffic Noise" Int. J. Environ. Res, Public Health 2008, 5(3) 165-171 International Journal of Environmental Research and Public Health ISSN 1661-7827[4]
Examining the spatial-temporal aspects of traffic noise in an urban environment was the primary goal of the research. The report delves into the study's findings, observations, and interpretations. In order to generate several noise indices and conduct statistical analyses, data recorded from the location between April 2006 and March 2006 was used. The development of Noise Risk Zones and effect assessments necessitated the creation of noise maps. A mean Lan value of 55.1 to 87.3 dB (A) was observed. During the day, the Le level was 51.2 to 89.0 dB (A), while at night, it was 43.5 to 81.9 dB (A). The research shows that the noise level is higher than what is allowed by CPCB in all areas. According to the results, the people living in this industrial town are subjected to an extremely high decibel level, mostly from the sound of passing vehicles.

III. OBJECTIVES

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

IV. STUDY AREA

4.1 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 city 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 sex ratio in 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. [3]

4.2. RESIDENTIAL AREAS:

Kalaburagi has seen significant growth in its residential sectors due to urbanization and infrastructure development. Some prominent residential areas include:
Sedam Road
Jewargi Road
Shahbazar
M.S.K. Mill Area
Humnabad Ring Road
Aiwan-e-Shahi Area
I did monitoring of N.P in Aiwan-e-Shahi Area .It is situated near to PDA College of Engineering

According to the Central Pollution Control Board (CPCB), the permissible noise level in residential areas in Karnataka is 55 decibels (dB) during the day and 45 dB at night. In silence zones, the limit is 50 dB during the day and 40 dB at night.
Some sources of noise pollution include: Musical instruments, Transistors, Loudspeakers, Industrial noise, and improper urban planning.
Noise pollution can affect people's hearts, blood pressure, brains, and ears. It can also affect the brains of animals and newborn babies, which can have long-term negative effects on their lives.

Fig NO 1 Residential area

4.3. Commercial Area:

Kalaburagi has several commercial hubs that serve as the city's economic backbone. Some of the key commercial areas are:
Super Market
Sardar Vallabhbhai Patel Market (SVP Market)
Kalasipalyam
Central Bus Stand Area
Main Road (MG Road).
I did monitoring of NP (noise pollution) in super market.
Distance - 3.4 Km from PDA
Pin code - 585101
The main commercial hub in the city, Super Market is always bustling with activity. It has a wide range of shops, from small vendors to large retail outlets, making it a popular shopping destination. 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 and 55 dB at night.
Some sources of noise pollution in commercial areas include:
Traffic: Traffic congestion can be caused by a lack of proper footpaths in commercial areas, which can lead to noise pollution.
Construction: Construction can be a source of unwanted sound.

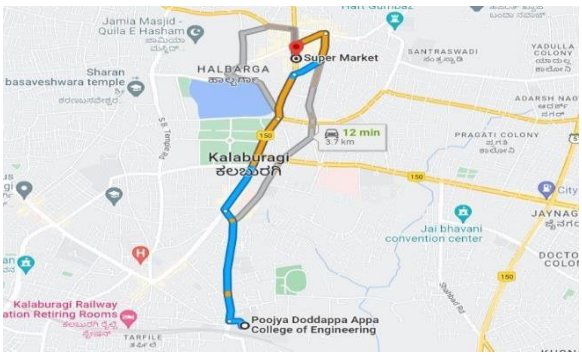


Fig NO 2 Commercial area

4.4. Industrial area

Kalaburagi has a growing industrial sector, primarily focused on cement production, textiles, and agro-based industries. Key industrial areas include:
KIADB Industrial Area
Sedam Road Industrial Area
Old Jewargi Road
Ring Road Industrial Area
Kapnoor Industries
I did monitoring of NP in Kapnoor industries. It is located 27 Km towards north from dist head quarter Gulbarga
Distance – 11 Km from PDA
Pin Code – 585104

When factories and other industrial facilities make too much noise, it's known as industrial noise pollution. It may originate from a variety of places, such as machines, tools, procedures, and activities. Industrial noise is particularly hazardous to people and the environment because it is often loud, continuous, and has a high frequency. Industrial noise pollution may be seen in several forms, such as: Grinding and chipping tools, as well as pneumatic moulding machines, are examples of pneumatic power tools. Some examples of kapnoor industries include those dealing with paper, steel, cement, and so on.
Daytime maximum allowable noise level is 75 dB and nighttime minimum is 70 dB.

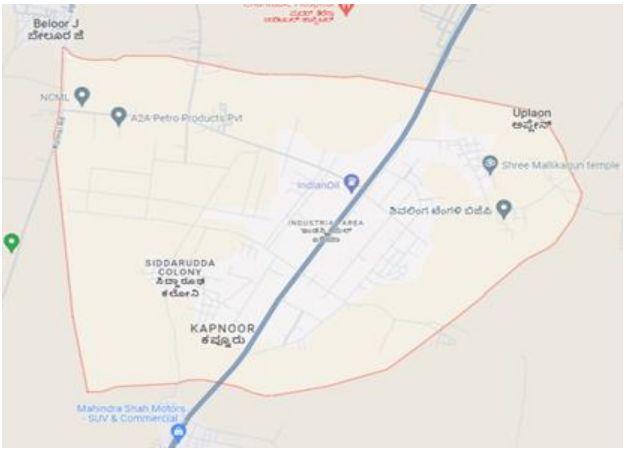


Fig NO 3 Industrial Area

V. METHODOLOY

The method of noise level monitoring involves using specialized equipment, such as sound level meters or noise dosimeters, to measure and quantify the intensity of sound in a given environment. I used the below instrument to measure the noise pollution in different areas in kalaburagi city.

5.1 About the Instrument:

To monitor the sound pollution, we used an instrument which is known as Decibel meter or Sound Level Meter.

Sound Level Meter

Fig NO 4 Sound Level Meter

Sound Level Meter (SLM)

The numerical waveforms of the analogue noise are measured and shown by the sound level metre S12. Displayed in decibels are several metrics such as sound pressure level, peak, and equivalent continuous sound level (Leq). A baseline of 20 micropascals (μPa) is established as the sound pressure. A sensor and a frontend make it up. It is lightweight and simple to use.

- Connection

Figure 1) is a conceptual diagram of system connection. In the figure, a microphone is attached to the calibrator.

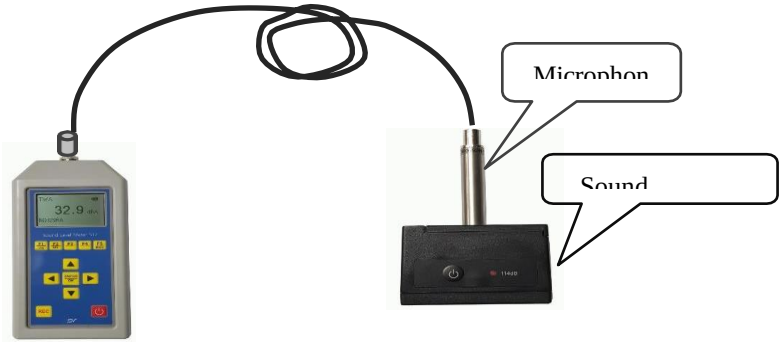


Fig NO 5 Connection

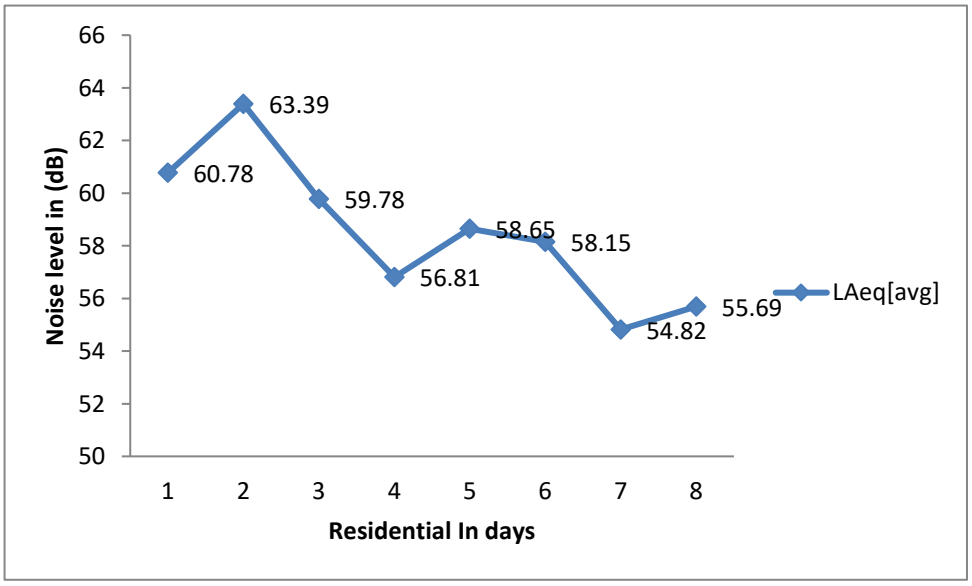
VI. RESULTS AND DISCUSSION

Identified different locations in kalaburagi city. I had taken readings of Residential Area (R.A) Commercial Area (C.A) and Industrial Area (I.A) in morning, afternoon and evening hours.

Residential Area

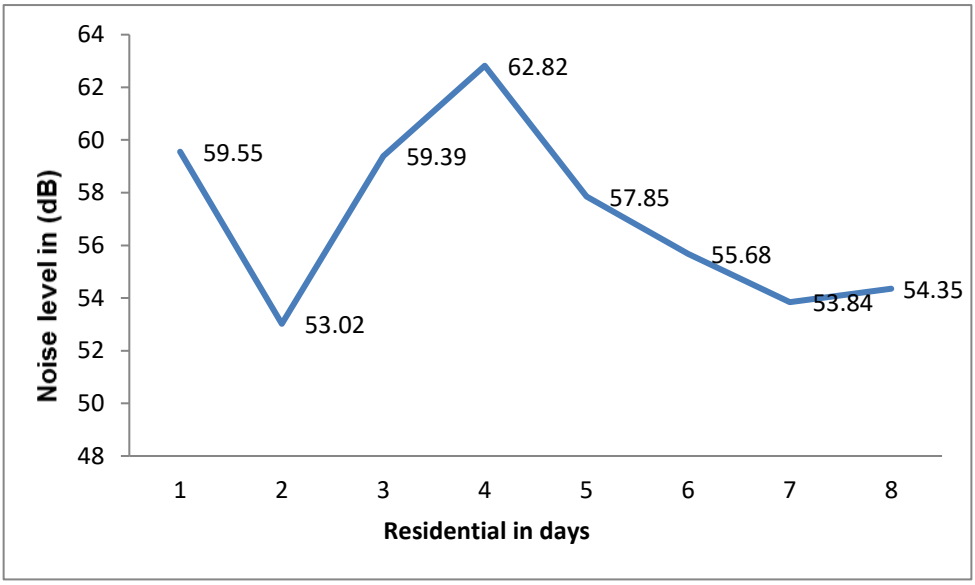
In Aiwan–e-Shahi, the climatic condition changed day after day.it was cloudy, rainy, sunny conditions. It varies in morning, afternoon, evening. The direction of wind was North-East and South-West. It changed day to next day.

Noise level during morning hour's in (dB)

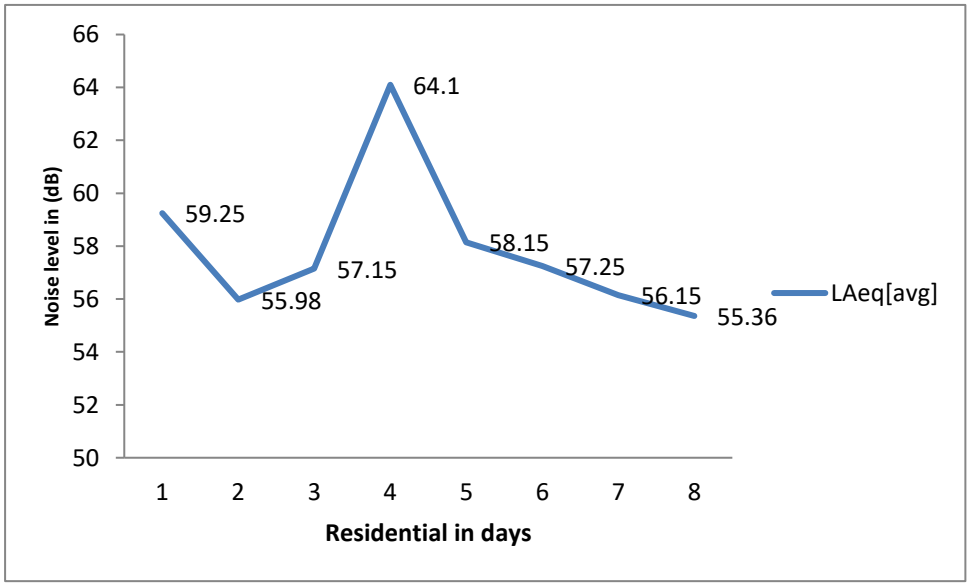


Graph: 1

Noise level during afternoon hour's in (dB)



Noise level during evening hour's in (dB)

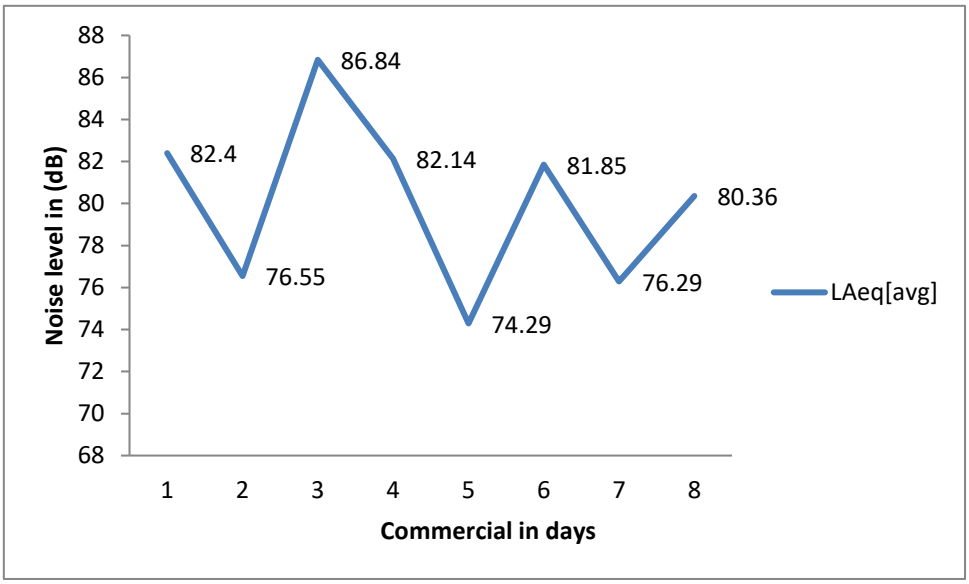


Graph: 2

By monitoring NP in residential area on morning and afternoon & evening. I observed both table & graph noise was varying day by day. I consider only average noise level readings .The minimum noise level by considering on morning evening & afternoon hours is 37.59 dB and maximum is noise level 79.26 dB the average noise level is 64.10 dB. These are almost above the CPCB standards.

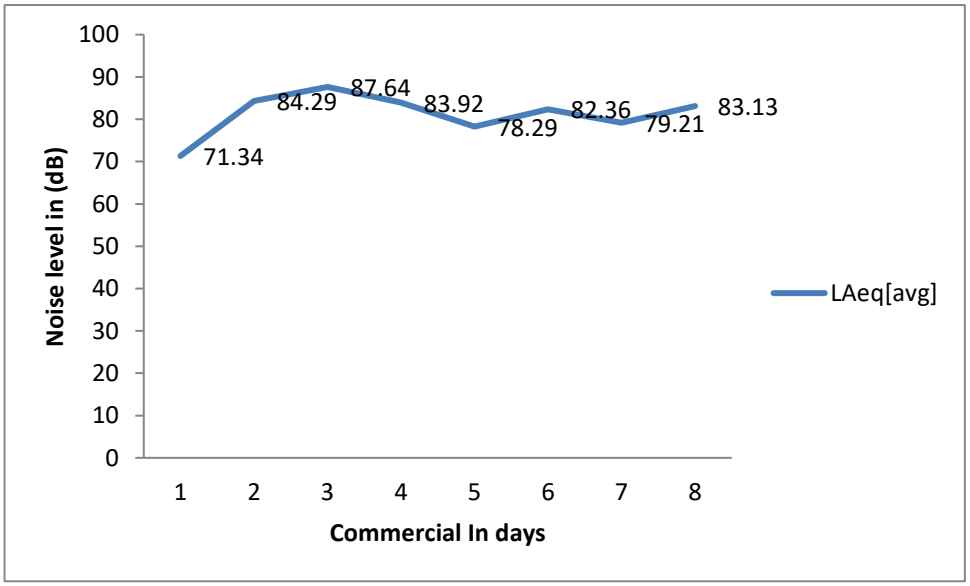
COMMERCIAL AREA

I monitored NP in super market on morning (10am) evening (5pm) & afternoon (2pm) hours.
The analysed readings are below in table.
Noise level during morning hour's in (dB)



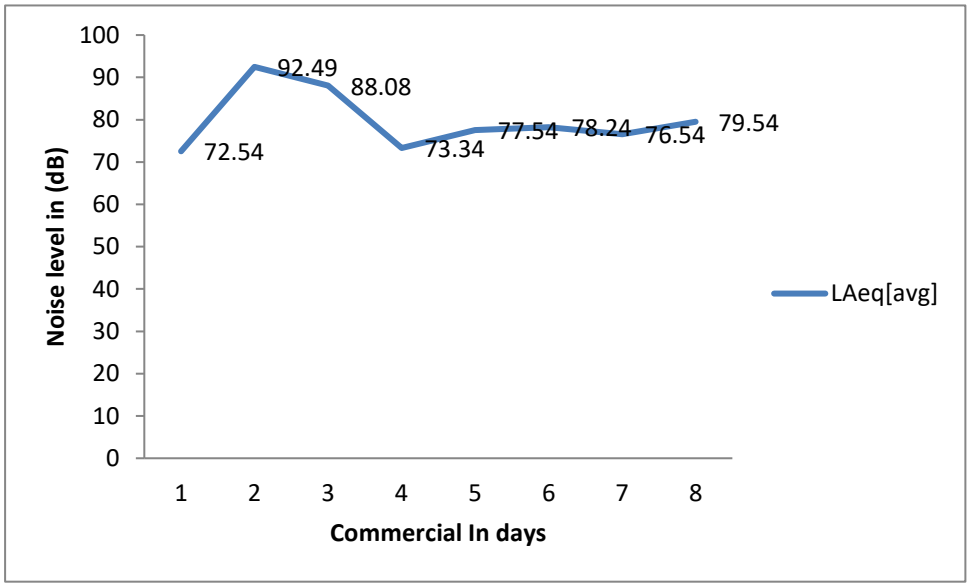
Graph: 3

Noise level during afternoon hour's in (dB)



Graph: 4

Noise level during evening hour's in (dB)



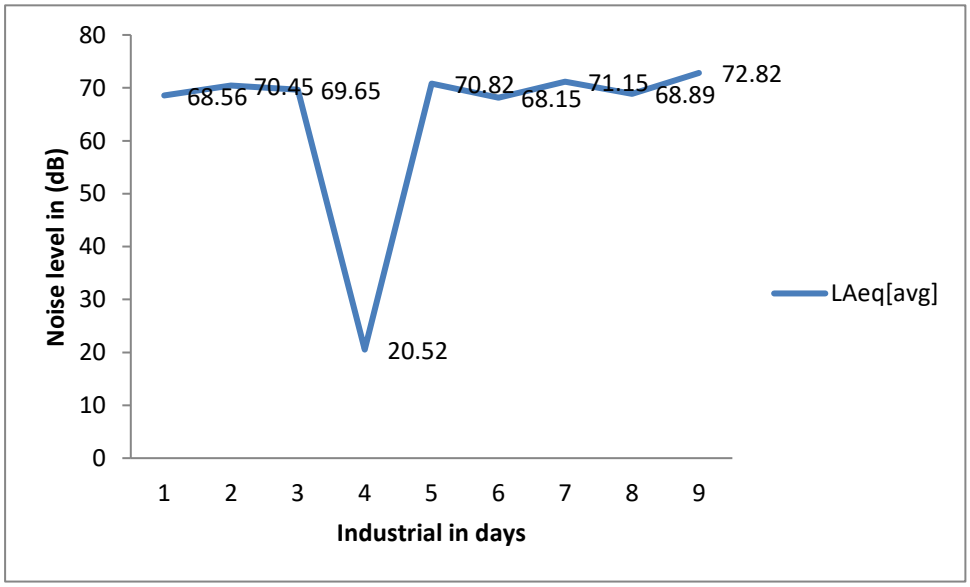
Graph: 5

By observing analysed readings from table & graph, minimum noise level by considering all three session is 45.38 dB and the maximum noise level is 108.93 dB and average noise level is 98.49 dB. These are almost above the CPCB standards.

INDUSTRIAL AREA

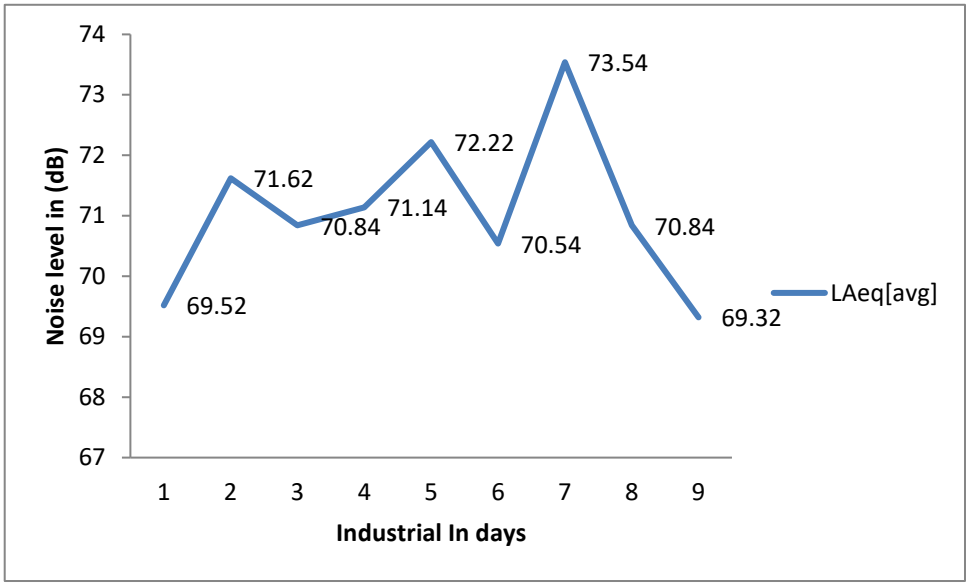
I monitored NP in kapnoor industries in morning and evening and after seasons on the given days with respect to time. Analyzed readings in kapnoor industries are below in table

Noise level during Morning hour's in (dB)



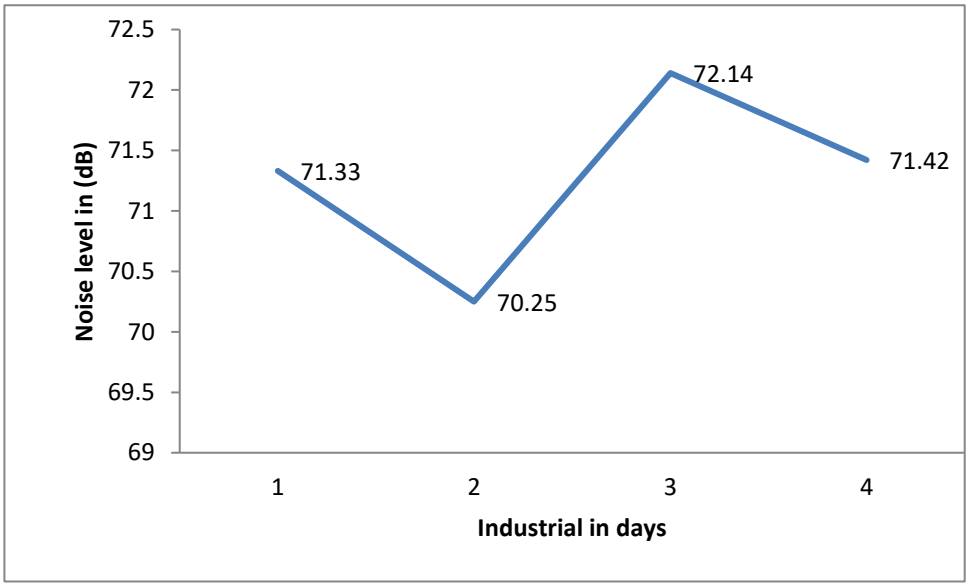
Graph; 6

Noise level during Afternoon hour's in (dB)



Graph: 7

Noise level during Evening hour's in (dB)



Graph: 8

The graphs are plotted by taking days along x- axis and noise level along y- axis by observing four columns I considered LA eq [Avg] for plating the graphs
By observing the analyzed readings in table and graph minimum Noise Level is 44.50 dB and maximum is 92.41 dB and average is 77.80 dB. This is almost above the CPCB standards.

The noise pollution monitoring was done at different locations of Kalaburagi city. The noise level of particular area was noted and respective graphs have been plotted. Noise in certain areas exceeded the permissible noise level

prescribed by CPCB (CENTRAL POLLUTION CONTROL BOARD) of the considered areas. According to which suggestions have been suggested the Industrial area exceeded the permissible limit as per CPCB at certain point which can't be stopped, Commercial area also exceeded the permissible limit as per CPCB at certain point as per the graph plotted which can't be stopped completely, Residential area is exceeded permissible limit as per CPCB.

EFFECTS ACCORDING TO SURVEY:

According to our survey at GIMS Hospital Kalaburagi. We were able to gather some information from the patients admitted in Hospital (ENT WARD).According to one of the patients, He was suffering from severe headache and minimal hearing problem. According to Doctor, he was suffering from Noise Induced Hearing Loss (NIHL). This was caused due to exposure to High Noise intensity.

Fig NO 6

Fig NO 7

Fig NO 8

CONCLUSION

The nation's capital has shockingly high levels of sound pollution. A study found that it has far beyond the permitted limit, endangering public health. The assessment, which was carried out at several locations across the city, found that sound pollution levels had risen to 70-110 dB, which is over double the allowed threshold. The data reveals that noise pollution has been steadily rising over Kalaburagi. Daytime noise levels in Kalaburagi peaked at 108 dB, while evening levels dropped to a low of 20.52 dB.

Keep away from building narrow roads if you can.

Using materials that reduce sound during building construction

We must not ignore the grave danger posed by noise pollution. The first step in addressing this is raising public awareness about the many illnesses that may be triggered by excessive noise. Our primary objective should be to use machinery and tools that produce little noise.

- From noise map it is observed that noise exceeded the permissible values recommended by CPCB in Industrial and Commercial areas mainly during evening hours.
- In Residential area the noise was within the permissible value as per CPCB.

- Effects of noise pollution on patients were noted by visiting hospital by interaction with Patients and Doctors.
- Suggestions for controlling noise are also specified.
- A sound pollution indicator model is built for use in traffic junctions which may be helpful in controlling noise at that particular traffic junction.

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