

ASSESSMENT AND TIME-SERIES ANALYSIS OF TRAFFIC NOISE POLLUTION ALONG LUCKNOW-FAIZABAD HIGHWAY AND LUCKNOW-KANPUR HIGHWAY, LUCKNOW

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ABSTRACT

Noise pollution is known for among the major causes to impact the people living in urban areas across the world. Automobiles, construction, festivals, factories, stations, diesel shades, garages and workshops are sources of noise. Vehicles are increasing enormously beyond the carrying capacity of the road. Study was carried out at 2 locations with sound level meter to assess day time and night time noise levels of Lucknow city. This study was done from Lucknow-Faizabad Highway to Lucknow-Kanpur Highway and vice-versa. The Noise monitoring was done for Lucknow-Faizabad Highway to Lucknow-Kanpur Highway of using sound pressure level meter. The noise monitoring was done for 24 hours by considering the peak hours of entire period of locations. The Modelling and mapping of major highways noise was done using MAS Environmental health consultancy tool available for use for free of cost and the modelling results were validated using the onsite measurements. The results revealed that the highest real value at Lucknow -Faizabad Highway is 98 dB and lowest real value is 62.8 dB. The peak noise was highest real value at Lucknow-Kanpur Highway is 99 dB and 69.5 is the lowest real value measured and it was found that horns are the reasons for the peak sound level in morning as well as night. The recorded from Lucknow-Kanpur Highway, commonly known as Kanpur Road doesn't comes under silence zone as it consist Chaudhary Charan Singh International Airport, Transport Nagar, Car Showrooms and their service centers within the range of 1-2 kms.

Keyword: - Noise pollution, Highway Traffic Pollution, CPCB, Assesment, Pollution

1. INTRODUCTION

Noise Pollution refers to the rise in the amount of natural ambient noise due to human activities producing sound, which can have adverse effects for humans and animals. Anthropogenic noise is sometimes referred to as sounds of this kind. Any of these noises, such as music, sirens, seismic survey noises or military sonar, are intentional and desired. However, most anthropogenic noise is an unintended by-product, such as noise from traffic or engines, and impulsive vehicle noises. [1]. Generally speaking, a noise is characterized as an unwanted sound and is entirely subject to personal tastes and tolerance levels. In addition, the sensitivity of the human ear to noise depends on a number of contextual variables, typically including wind, temperature, volume of traffic, etc. However, it is

generally agreed that a 55 dB (A) sound will be irritating, whereas a 65 dB (A) noise level will be considered intolerable, causing extreme sleep disturbance. [2]. In present scenario of rapid urbanization, environment degradation and maintenance of its quality is major concern for policy makers. Noise pollution in urban environment is emerging as a threat to quality of life impacting the peace of outside working environment. In urban environment road traffic is making the surrounding noisier day by day. People travelling in these environments are prone to noise affecting their quality of life. Sound which is unwanted or disrupts one's quality of one's life is said or is named as Noise. If there's a lot of noise in the surrounding, it's called sound pollution. Many studies are conducted keeping the vehicle's in consideration regarding effect of noise pollution on them. Present study focuses on the effect of noise pollution on the people travelling on the highways and those who are living near the highways.

1. IMPORTANCE OF STUDY

Lucknow City is widely referred to as the 'Nawabs City.' It dates back to the Suryavanshi dynasty period on the banks of the Gomti River. Lucknow, the capital of Uttar Pradesh, was founded by Nawab Asaf-ud-Daula. It acted in the old days as the capital of the nawabs of Awadh and is one of the reasons why it is now called the town of the Nawabs. The Nawabs era brought the courteous culture to Lucknow, as well as the traffic in the city is increasing day by day for which it is getting famous in the rushiest cities in INDIA today. The Atal-Path (Shaeed path) is constructed to deviate the traffic directly from Lucknow-Faizabad Highway to Lucknow-Kanpur Highway and vice-versa, without entering in the city. Mainly this Highway also connects Lucknow-Sultanpur Highway and Lucknow-Raebareilly Highway. Lucknow, the capital of Uttar Pradesh province in northern India. It is located about 72 km (45 miles) northeast of Kanpur, on the Gomti River in the centre of the state. The city receives a huge amount of traffic due to its importance and road network. This can contribute to a high degree of traffic noise this needs to be taken care of.

2. MATERIALS AND METHODS

During the summer season (June to July), the latest survey on ambient noise pollution assessment and review was conducted in the city of Lucknow. In the sense of demography, geographic locations and meteorological aspects during the course of the analysis, Table 1 presents the data on Lucknow city. Table 2 displays the five sampling areas / zones of Lucknow city selected for the study of noise pollution. Noise levels were measured using the Sound Level Meter (YFE Model YF-20). The meter was located 1.3 to 1.5 m above the earth's surface and 3.0 to 3.5 m away from the reflective surface, if any. Noise measurements were carried out continuously for each sampling site over a span of five days, nine hours, and every 15 minutes of observation every day on both sides of the highway at the peak hours to obtain the appropriate readings. The schedule that was selected according to the Peak Hours were 6:00am-10:00am in the morning, 4:00pm-6:00pm in the afternoon and 7:00pm-10:00pm in the night time. For every single hour, the noise level was recorded every minute with 15 minutes on one side and the other 15 minutes on the other side of the highway. For statistical analysis, the data gathered from each position was processed.

Table 1. During the study period, the demographic, geographic locations and meteorological aspects of Lucknow city

Sr. No.	Parameters	Documented Values
1	Population	3,677,000
2	Latitude	26.8467° N
3	Longitude	80.9462° E
4	Geographical area (km ²)	349
5	Max. temperature	33

6	Min. temperature	19
7	Mean sea level (m)	123 meters
8	Annual Rainfall (mm)	1001 mm
9	Population density (No. of persons/km ²)	1,815
10	Wind speed (km/h)	5km\h
11	Humidity (%)	26

2. MEASURING INSTRUMENT

2.1 SOUNDS LEVEL METER

Noise measurements were conducted using a built-in NL-42 Average Sound Level Meter designed to measure sound levels in accordance with the IEC standard. It enables diffuse sound field measurements and, when mounting the supplied windscreen, also meets standard requirements.

Specifications:

SL-1352 IEC 61672-1CLASS2
Main processing (Main channel)
Instantaneous sound pressure level- L _p
Equivalent continuous sound pressure level Leq
Sound exposure level - LE
Maximum sound pressure level – L _{max}
Minimum sound pressure level – L _{min}



Figure.1: SOUND LEVEL METER

Table:2- Sampling sites of Noise emissions in Lucknow

Sr. No.	Location	Position
1	Lucknow-Faizabad Highway	Both Side of The Highway At Every 15 Minutes
2	Lucknow-Kanpur Highway	Both Side of The Highway At Every 15 Minutes

2.2 LUCKNOW-FAIZABAD HIGHWAY Passing through Atal Path (Shaeed Path)

Lucknow-Faizabad Highway is an highway which passes through the starting point of Shaeed Path in Lucknow, situated in India. It is one of Lucknow's most important residential and commercial areas and also one of the city's heavily populated regions. It is famously known as Faizabad Road.



Figure:2.1- Starting point of Shaeed Path at Lucknow-Faizabad Highway

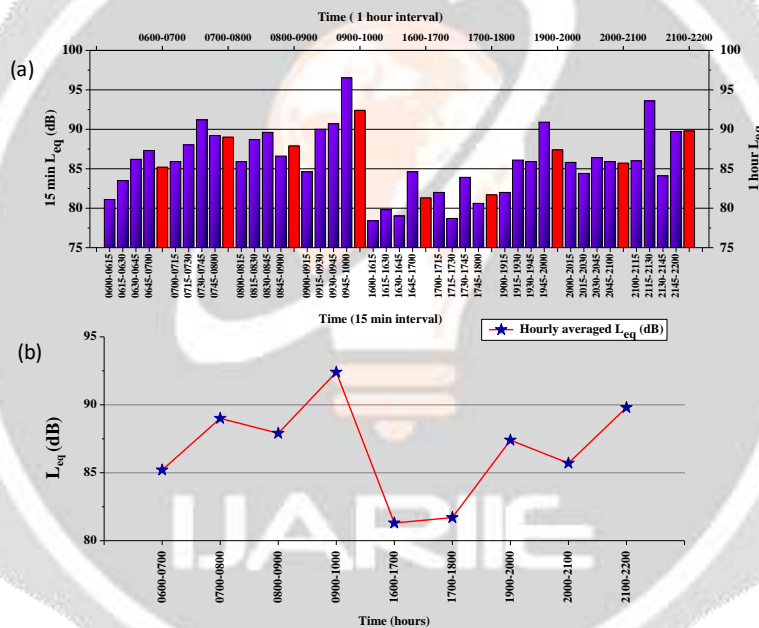


Figure. 2.2 (a) Temporal variation (b) Hourly variation of equivalent sound level at LUCKNOW-FAIZABAD HIGHWAY

2.3 LUCKNOW-KANPUR HIGHWAY Passing through Shaeed Path

Lucknow-kanpur Highway is an highway which connects Lucknow to Kanpur and passes through the Chaudhary Charan Singh International Airport of Lucknow and is an ending point of Shaeed Path in Lucknow, situated in India. It is one of Lucknow's most important residential area and is popularly known as Kanpur road and also connects Lucknow Charbagh railway Station. The Transport nagar and the RTO of lucknow is also based on that ending point of Lucknow-Kanpur Road at Atal Path, commonly known as Shaeed Path.



Figure:3.1- Ending point of Shaeed Path at Lucknow-Kanpur Highway

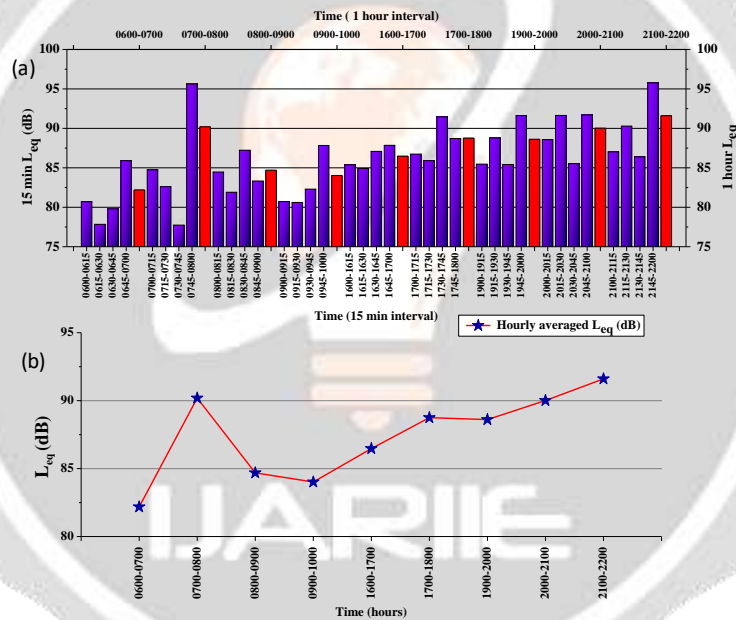


Figure. 3.2 (a) Temporal variation (b) Hourly variation of equivalent sound level at Lucknow-Kanpur Highway

Table :3. Noise standards for Ambient Noise Level according to CPCB

Area code	Category of Area	Limits in dB (A)	
		Day	Night
A	Commercial	65	60
B	Industrial	75	70

C	Residential	55	50
D	Silence Zone	45	40

Table 4. Highest and lowest average value of noise level of three shifts and whole day (6 am – 10pm) in working days

Points	Morning (6am-10am)		Afternoon(4pm-6pm)	
	Hav	Lav	Hav	Lav
Lucknow-Faizabad Hihway	104.3	61	92.6	61.8
Lucknow-Kanpur Highway	101.1	67.4	97.7	73.4
Points	Morning (9pm-10pm)		Afternoon(6pm-10pm)	
	Hav	Lav	Hav	Lav
Lucknow-Faizabad Hihway	97.3	65.3	98	62.8
Lucknow-Kanpur Highway	98.4	67.9	99	69.5

Table 5. Equivalent Sound Pressure Level for Different Selected Highways

HIGHWAYS	Equivalent Sound Pressure level (dB)
LUCKNOW-FAIZABAD HIGHWAY	87.96939
LUCKNOW - KANPUR HIGHWAY	88.32856

2.4 NOISE LEVEL MEASUREMENT

The noise level is estimated at the survey sites and then the percentile noise levels and the corresponding continuous level of sound are estimated. The noise level is typically documented over a period of time and a graph is graphed between sound pressure levels and time.

3. RESULTS AND DISCUSSIONS

Some commercial types of area are mainly served by Lucknow-Faizabad Highway and Lucknow-Kanpur Highway. The normal sound maximum for the commercial area is 75 db which is maximum including Industrial, Commercial, Residential as well as for the Silence zones but the highest real value at Lucknow -Faizabad Highway is 98dB and lowest real value is 62.8 dB. As for the same Lucknow-Kanpur Highway is Industrial, Commercial as well as an Residential Zone, the highest real value at Lucknow-Kanpur Highway is 99 dB and 69.5 is the lowest real value. As from Lucknow-Kanpur Highway, commonly known as Kanpur Road doesn't comes under silence zone as it consists Chaudhary Charan Singh International Airport, Transport Nagar, Car Showrooms and their service centers within the range of 1-2 kms, so automatically the level of noise over that area will be more and clearly we can say it doesn't comes under the desired criteria set for that Area by the CPCB. In contrast to the CPCB requirements, the situation in this zone is also risky. But the average time for the Leverage day reaches the normal maximum. The residents of this region are thus in a vulnerable position. The outcome means that the socio-environment associated with these noisy impact areas is significantly contaminated and has become very vulnerable to inhabitants.

4. CONCLUSIONS

The study showed that the noise level in Lucknow City had reached an alarming level. In much of the city, there is a greater noise level than the defined limits. Of the total individuals interviewed, about 85% were found to be impaired by traffic noise. Around 90 percent of individuals suggested that traffic noise is the primary cause of headache, elevated BP issue, dizziness and fatigue. Owing People of higher education and income levels are quite conscious of the health consequences related to road noise. The development of an ecologically sound transport system is aimed at reducing the environmental damage caused by transport-related noise and pollution. Increased awareness of the risks of harmful pollution and noise resulting from the amount of traffic caused by rapid growth in motorization. Therefore, it is important to supplement the total cost of transport operations with the external cost of negative impacts on the environment when planning the growth of the transport system.

5. REFERENCES

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