



A STUDY ON NOISE POLLUTION AND TRAFFIC VOLUME AT SOME SILENCE ZONES OF PALAKOLLU, WEST-GODAVARI DISTRICT, ANDHRA PRADESH, INDIA

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ABSTRACT

Noise pollution is unwanted sound, undesired by the recipient. It is also a form of air pollution. It has both physiological and psychological impacts on human health. Noise is therefore a serious environmental problem that requires attention. It is more severe and wide spread than even before, and it will continue to be increasing in intensity because of population growth, urbanization and the associated growth in the use of powerful, varied and highly mobile sources of noise. Palakollu is a developing town having road and rail transport connecting to different places. Day by day development causes a noisy environment in the town. In the present comparative study, noise pollution and traffic volume have been monitored at five silence zones of Palakollu (Euro kids' school, Aditya college, Sri Chaitanya school, Bashyam school, DNR college) during four different time periods of one hour duration each (9AM-10AM, 11AM-12PM, 2PM- 3PM, 4PM-5PM). Then Equivalent noise levels are calculated and compared with CPCB standards for silence zones and Remedial measures are discussed.

KEY WORDS : Equivalent noise level, Traffic volume, Remedial Measures, Undesired, Urbanization.

I. INTRODUCTION

Noise pollution is the propagation of noise with ranging impacts on the activity of human or animal life. Poor urban planning and zoning may give rise to noise pollution in the residential areas and silence zones. Some of the main sources of outdoor noise include loud music, transportation (traffic, rail, airplanes, etc.), lawn care maintenance, construction, electrical generators etc. Although transportation is an indispensable part of the modern society, its benefits may be overshadowed by its negativities such as air and noise pollution and is a cause for concern for the community. Noise is a very complex phenomenon not only in its physical aspect but also in its psychological and medical dimensions, impacts such as community annoyance, dissatisfaction, interference with communication, sleep disturbance, impaired task performance, auditory, physiological, and other health issues result from this. Such impacts are adverse and can be cumulative with prolonged, continuous, or repeated exposure. Especially in Silence zones noise pollution is of concern as it acts as a distracting stimulus.

II. MATERIALS AND METHODS

Measurement of Noise Level: The Integrating Sound Level Meter-4030 was used for recording the noise level in the study sites. This integrating sound level meter is an instrument with max hold option. It is very simple to operate and is an ideal and essential tool for noise measurement and data collection in the field. It has a wide measurement range and a host of features like A, C, and Linear weighting. The measuring range of this device varies between 30-130dB. The device consists of detachable microphone, rechargeable battery and an alphanumeric display are provided on the instrument. All parameters of the instrument are software controlled. Slide the A/C weighting selector to the "A The characteristic of A weighting is simulated as the "human ear listening" response. It is suitable for checking the noise of machinery & knowing the real sound level of the tested equipment. The instrument is held in hand and pointing the microphone, the measurement of noise is done. The sound level will be displayed on the "dB" (decibel) unit.

1. Electret Condenser Microphone.
2. LCD Display.
3. Power switch
4. Level range control switch:
30dB~80dB; 50dB~100dB; 60dB~110dB;
80dB~130dB; 30~130dB
5. Maximum value hold switch. (MAX)
6. Equivalent weight select switch:
A: A weight for general sound level measurements.
C: C weight for checking the low frequency content
of noise.

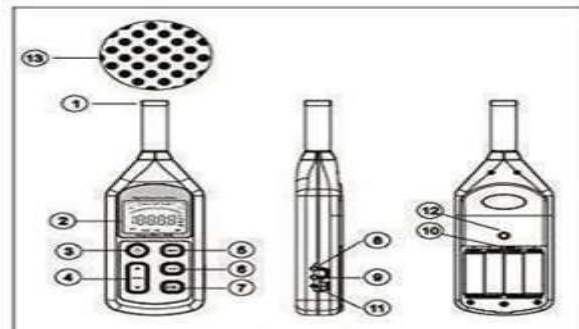


Fig. 1. Noise meter

The automobiles/vehicles that are passing through the 5 silence zones are noted in one hour duration each according to their classification like cars, buses, autos, bullock carts etc. This survey is performed in five silence zones of Palakollu, Euro Kids school, Aditya college, Chaitanya techno school, Bashyam school, and D.N.R. government college. Study is conducted in 4 different time periods for one hour duration each (i.e., 9am to 10am, 11am to 12pm, 2pm to 3pm and 4pm-5pm) at each location for 7days (Monday to Sunday). After getting the total vehicles count in an hour in different classes, each vehicle class is needed to be multiplied with respective PCU values suggested for urban roads by Indian Roads Congress (IRC).

Table 2.1. Environmental noise standards as prescribed by Central Pollution Control Board (CPCB)

Area Code	Category of Area	Limits in dB(A)	
		Day Time *	Night Time **
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Area	50	40

*Day time : 6 am to 9 pm.

** Night Time : 9 pm to 6 am

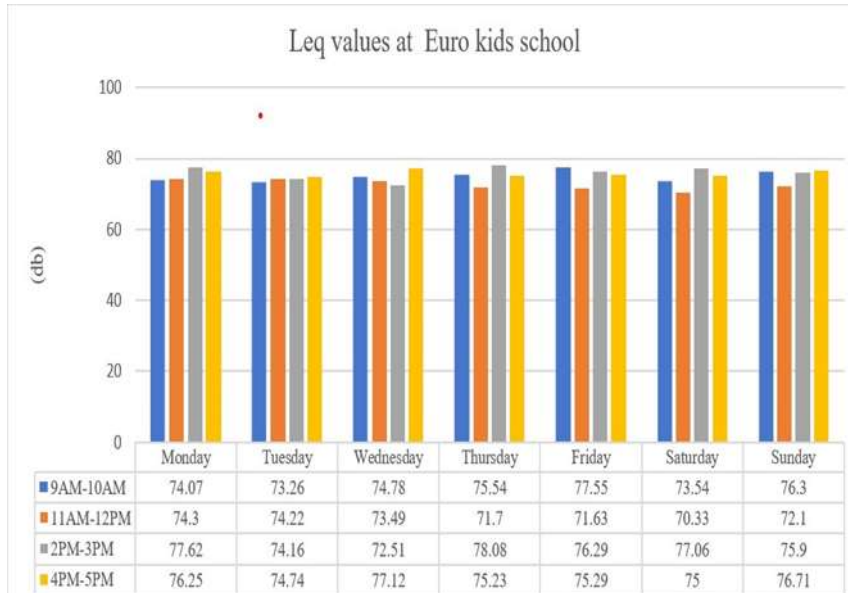
Table 2.2. Suggested PCU values for Urban Roads by the Indian Roads Congress (IRC)

Vehicles Class	PCU values of vehicle classes at		
	Urban roads, mid-block sections	Signalized intersection	Kerb parking (parallel & angle)
Car	1.0	1.0	1.0
Bus and Truck	2.2	2.8	0.4
Auto rikshaw	0.5	0.4	0.4
Two-wheeler automobile	0.4	0.3	0.2
Pedal cycle	0.7	0.4	0.1
Bullock cart	4.6	3.2	1.2
Hand cart	4.6	3.2	0.3

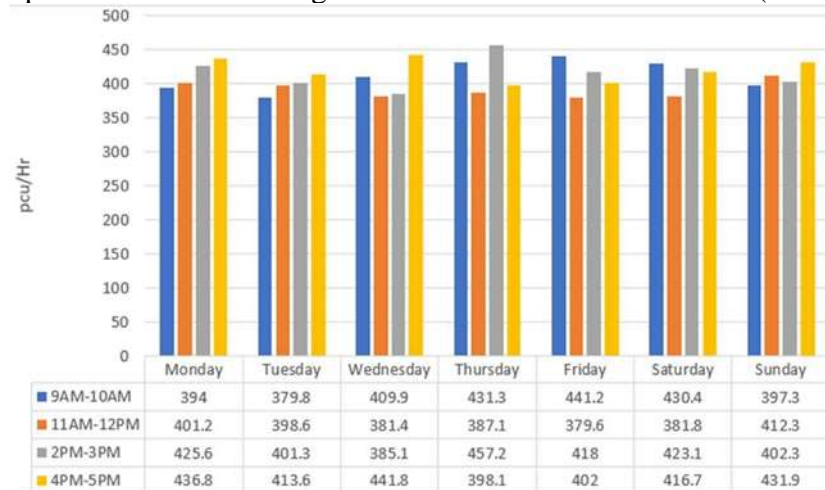
III. RESULTS AND DISCUSSIONS

3.1 Silence zone 1 (Euro Kids school)

Equivalent noise level (Leq) values for seven days (Monday to Sunday) at Euro kids school are ranging at (73.26– 77.55) dBA from 9-10am, (70.33– 74.3) dBA from 11am-12pm, (72.51-78.08) dBA from 2pm- 3pm and (75-77.12) dBA from 4pm-5pm. The highest value was recorded on Thursday 2pm-3pm, which is 78.08dBA and the pcu value on Thursday in between 2pm-3pm is 457.2pcu/hr. The values of Leq at Euro kids school exceeded the CPCB standard which is 50dB.



Graphical Representation of Passenger Car Units/Hr. in silence zone 1(Euro Kids school)

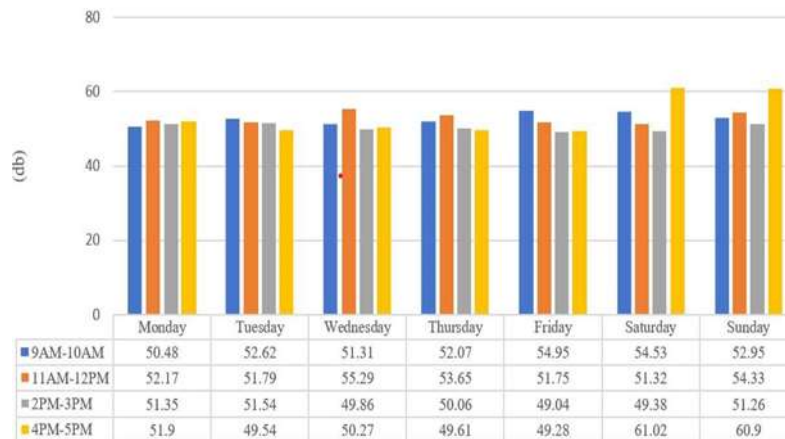


3.2 Silence zone 2 (Aditya Educational Institutions)

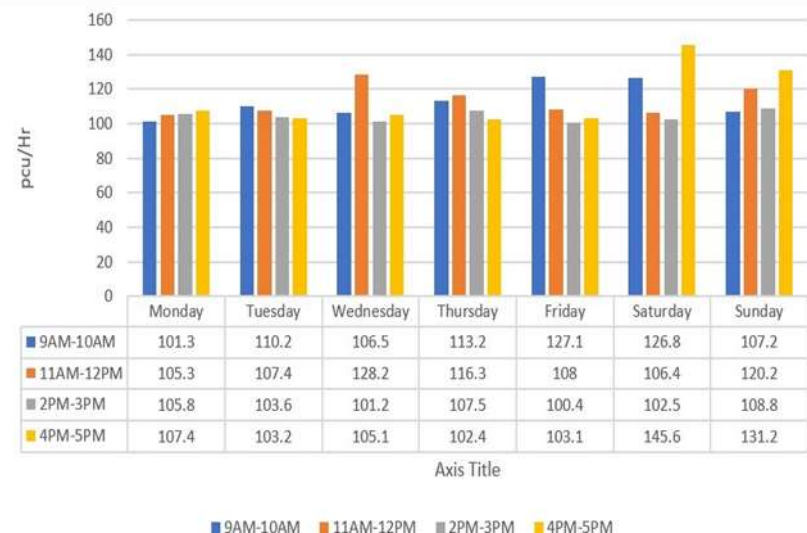
Equivalent noise level (Leq) values for seven days (Monday to Sunday) at Aditya Educational Institutions are ranging at (50.48-54.95) dBA from 9- 10am, (51.32-55.29) dBA from 11am- 12pm, (49.04-51.54) dBA from 2pm-3pm and (49.54-61.02) dBA from 4pm-5pm. The highest value was recorded on Saturday 4pm-5pm, which is 61.02dBA and the pcu value on Saturday 4pm-5pm is 145.6pcu/hr. The values of Leq at Aditya educational institutions exceeded the CPCB standard which is 50dB.



Leq values at Aditya College



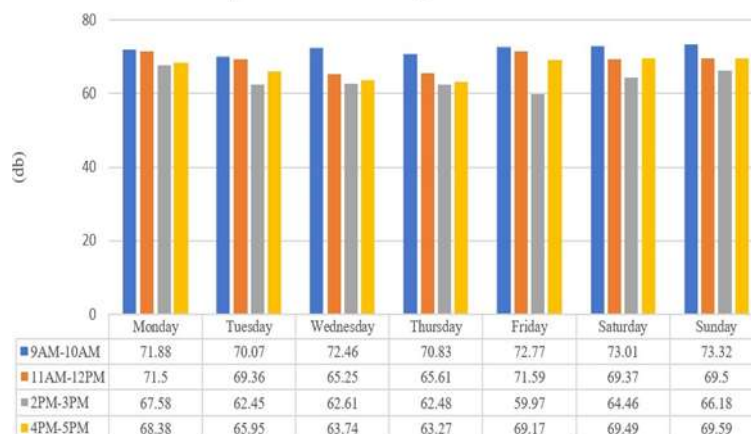
Graphical Representation of Passenger Car Units/Hr. at silence zone 2 (Aditya Educational Institutions)



3.3 Silence zone 3 (Sri Chaitanya Techno school)

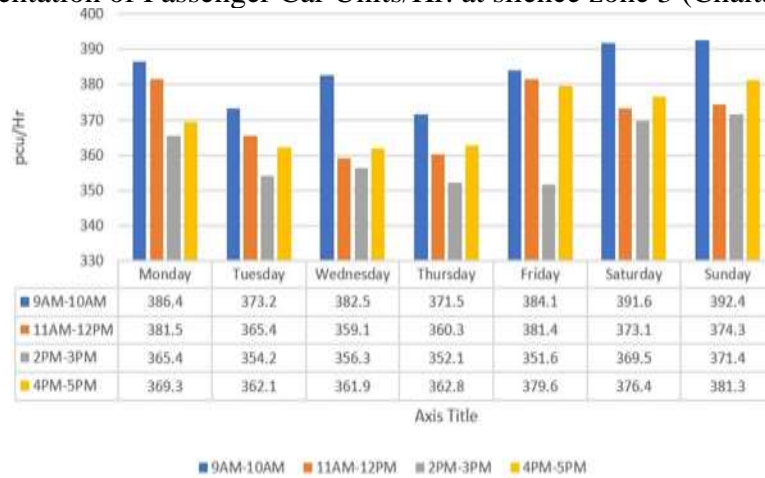
Equivalent noise level (Leq) values for seven days (Monday to Sunday) at Chaitanya Techno School are ranging at (70.07-73.32) dBA from 9-10am, (65.25-71.59) dBA from 11am-12pm, (59.97-67.58)dBA from 2pm-3pm and (63.74-69.59) dBA from 4pm-5pm. The highest value was recorded on Sunday from 9am-10am which is 73.32dBA and the pcu value on Sunday in between 9am-10am is 392.4pcu/hr. The values of Leq at Sri Chaitanya techno school exceeded the CPCB standard which is 50dB.

Leq values at Sri Chaitanya Techno school



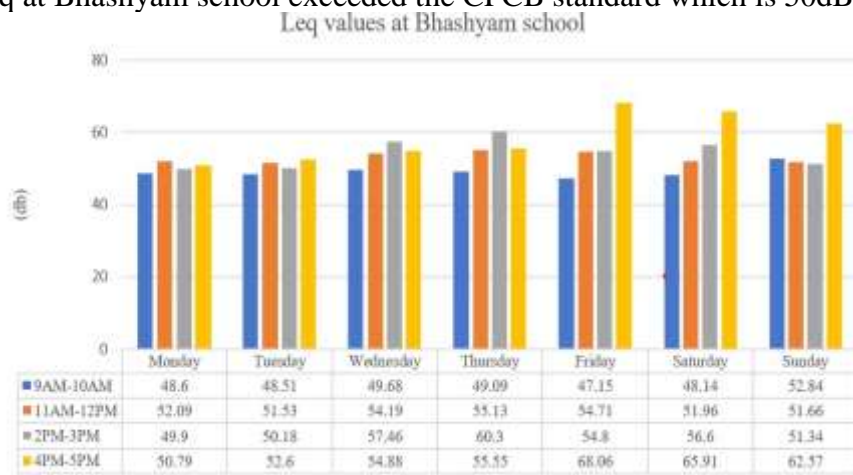


Graphical Representation of Passenger Car Units/Hr. at silence zone 3 (Chaitanya techno school)

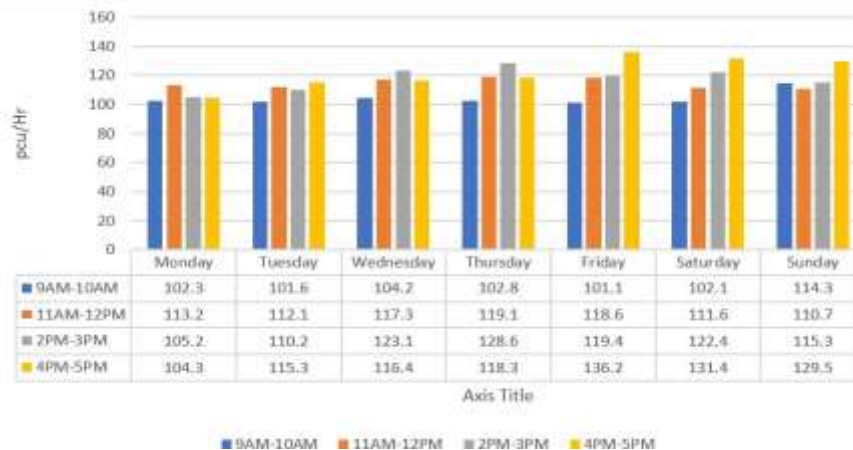


3.4 Silence zone 4 (Bhashyam school)

Equivalent noise level (Leq) values for seven days (Monday to Sunday) at Bhashyam school are ranging at (47.15-52.84) dBA from 9-10am, (51.53-55.13)dBA from 11am-12pm, (49.9-60.3) dBA from 2pm-3pm and (68.06-50.79) dBA from 4pm-5pm. The highest value was recorded on Friday from 4pm-5pm which is 68.06dBA and the pcu value on Friday in between 4pm-5pm is 136.2pcu/hr. The values of Leq at Bhashyam school exceeded the CPCB standard which is 50dB.



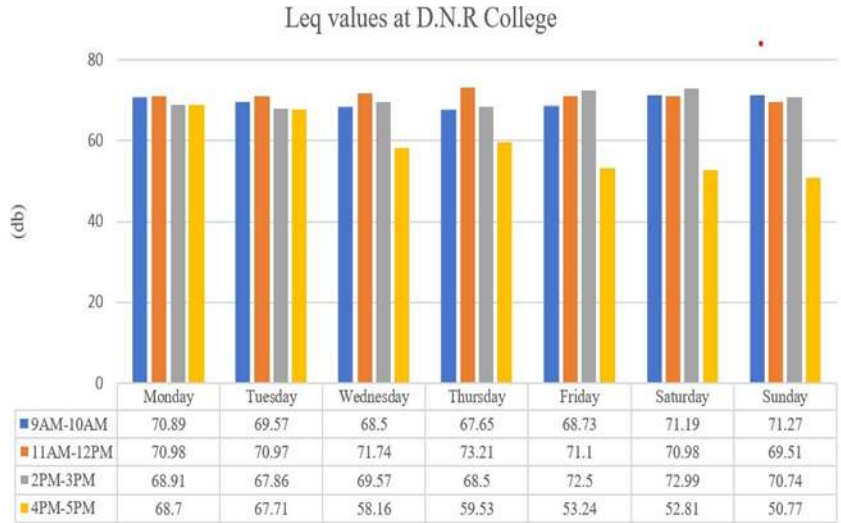
Graphical Representation of Passenger Car Units/Hr. at silence zone 4 (Bhashyam school)



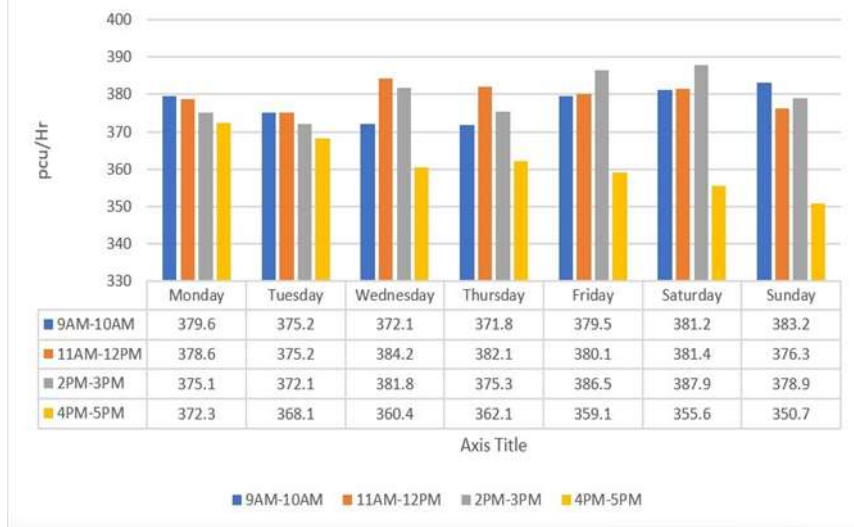


3.5 Silence zone 5 (D.N.R college)

Equivalent noise level (Leq) values for seven days (Monday to Sunday) at D.N.R College are ranging at (71.27-67.65) dBA from 9-10am, (69.51-73.21)Dba from 11am-12pm, (67.86-72.99) dBA from 2pm- 3pm and (50.77-68.7) dBA from 4pm- 5pm. The highest value was recorded on Thursday from 11am-12pm which is 73.21dBA and the pcu value on Thursday in between 11am to 12pm is 382.1pcu/hr. The values of Leq at D.N.R college exceeded the CPCB standard which is 50dB.



Graphical Representation of Passenger Car Units/Hr. at silence zone 5 (D.N.R college)



IV. CONCLUSIONS

1. In silence zone 1 the leq values has been exceeded the standard values given by the CPCB due to reasons like lack of trees which acts as a sound barrier and there is convention centre beside the school.

- Trees must be planted along the roads and around the buildings.
- It is better to install the sound proofing materials like sound proofing windows to the school.

2. In silence zone 2 the leq values has been exceeded the standard values given by the CPCB even though the college has been constructed away from the main road because the college is not surrounded by proper trees and the vehicles passing through the road are making loud noise.

- Honking in silence zones like schools, hospitals are need to be strictly restricted.
- Silencers must be installed in transport vehicles.



3. In silence zone 3 the leq values has been exceeded the standard values given by the CPCB due to college is located in a place beside the main road where there is heavy traffic flow and there was no protection of school with trees. And also, water drilling machinery works has been observed in the nearby area.

- Machinery activities are need to be restricted during working hours of the school.
- Controlling the speed limit of vehicles near school surroundings.
- Building a high fence using concrete wall or wood around the institutions proves to be useful for protecting the institutions from noise disturbance.

4. In silence zone 4 the leq values has been exceeded the standard values given by the CPCB even though the college is provided with dedicated road facility which is away from the main road traffic because a rice milling machine has been installed by the farmer and some agricultural activities has been going on which creates the noise.

- Machineries must be equipped with the silencers.

5. In silence zone 5 the leq values has been exceeded the standard values given by the CPCB because the college is near to the main road where the traffic is more. And also, the noise emerging from the vehicles is more and there are some automobile workshops existing in that area.

- All automobile workshops should be located far from silence zones and those that are on roadsides and public places should be reallocated at other peripheral sites of the town.
- Awareness must be created about noise nuisance through adequate news, social media, lectures, radio talks and other programs among people.

REFERENCES

- [1] Avinash Chauhan and Krishna Kumar Pande (2010) "Study of noise level in different zones of Dehradun City, Uttarakhand"
- [2] Ambient Air Quality Standards in Respect of Noise, vide S.O. 123(E), dated 14/02/2000 issued by Central Pollution Control Board, New Delhi.
- [3] Bhavin N. Tandel and Pratik Ruparel (2011), "Importance of Urban Traffic Noise Pollution in Sustainable Transportation planning".
- [4] Dhananjay (2004) "Causes and Concern for Noise Pollution in India".
- [5] E.Atmaca, I.Peker and A. Altin (2005), "Industrial Noise and Its Effects on Humans".
- [6] Mali. S (2004) "Nature Environmental and Pollution Technology".
- [7] Mohan Singh Panwar (2016), "Analysis of Vehicular Noise Pollution at different Locations in Srinagar Town of (Garhwal) Uttarakhand".
- [8] Narendra Singh and S.C. Davar (2004) "Noise Pollution Sources, Effects and Control".
- [9] Punit Saraswat and Gopal Singh Chouhan (2018), "Assessing the Environmental Noise Level of Jodhpur, Rajasthan".
- [10] Singh. M.D and Kullitkaur (Journal of Punjab Academy of Forensics Medicine and Toxicology) "Noise Pollution and the Law".
- [11] Wazir Alam (2011), "GIS based Assessment of Noise Pollution in Guwahati City of Assam".
- [12] U.S Environmental Protection Agency (1974) "Equivalent Sound Level and Its Relationship to Other Noise Measured".

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