The Ecoscan 10(3&4): 467-469, 2016
AN INTERNATIONAL QUARTERLY JOURNAL OF ENVIRONMENTAL SCIENCES
www.theecoscan.com

ASSESSMENT OF VEHICULAR TRAFFIC NOISE FOR ALLAHABAD -VARANASI HIGHWAY, U. P

IBADAIAHUN MYRTHONG*, S. B. LAL AND SATYENDRA NATH
Department of Environmental Science, School of Forestry and Environment,
Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad - 211 007 (U.P) INDIA
e-mail: imyrthong644@gmail.com

ABSTRACT

Noise descriptors like L_{10}, $L_{90,}$ Leq and Traffic Noise Index (TNI) were assessed to reveal the extent of vehicular traffic noise level on the highway. The data recorded revealed that the Leq noise level at Alopi Bagh ranges from 91.65 to 93.28 dB, at Daraganj it ranges from 89.93 to 91.73 dB, at Shastri Bridge it ranges from 74.24 to 83.96 dB and at Andawa the Leq Noise level ranges from 90.57 to 94.11dB revealing that the noise level at all the selected sites exceeded the permissible limit of 65 dB given by MoEF and CPCB. The noise level was recorded maximum at 10-11a.m at Alopi Bagh 93.68dB and Andawa 94.11dB, while at Daraganj 91.85 dB and Shastri Bridge 91.95 dB the noise level was recorded maximum at 1-2 p.m. The present study helps us to conclude that the noise level at all the different sites increases at an alarming rate especially during the peak hours of the day since the traffic loads are choking the roads causing traffic breakdown thus increasing the noise in that particular area.

KEY WORDS
Monitoring
Noise Level, Vehicles
Traffic, Highways
Decibel

Received : 14.10.2015
Revised : 05.03.2016
Accepted : 17.07.2016

***Corresponding author**

INTRODUCTION

Highway noise is the sum of the total noise produced at the observer point by all the moving vehicles on the highway. The air quality degradation in cities are often due to increased emission from automobile traffic (Patel and Kousar, 2010). The growth in the Road Transportation Sector in India has been a key element in the economic development. In India, the national highways are the primary long distance roadways. Indian highways constitute approximately 2% of the total road network of India, but carry nearly 40% of the total traffic. About 65% of freight and 80% passenger traffic are carried by the roads. Number of vehicles has been growing at an average pace of 10.16% per annum over the last five year. (Yusoof and Ishak, 2005) studied that the increase in the number of urban highways constructed around residential and community areas around the city has inevitably caused major noise pollution problems to city dwellers. This has lead to overcrowded roads and various types of pollutions (Subramani *et al.,* 2012). The transportation systems in cities have become one of the most important factors for achieving the high standard of living of the people. But in recent years, the enormous growth of vehicle population and the latest development of highway system have created many problems by its side effects, Some of these problems have direct impact on the environment in which the people live. Noise is one of the environmental pollutant that is encountered in daily life (Kumar *et al.,* 2011). Noise pollution has become a major concern of communities living in the vicinity of major highway corridors. Number of vehicles has been growing at an average pace of 10.16% per annum over the last five years (Pandey and Dubey, 2012). In view of the above problems a study has been conducted for monitoring the vehicular traffic noise on the highway.

MATERIALS AND METHODS

Allahabad is one of the holy cities of India and a prominent centre for culture, administration and education. The city covers a total area of 63.07 sq. km with a population of 9, 90.298 at an altitude of 98 m above sea level. In this study, the data were collected from December 2012 to March 2013 at 4 different sites on the stretch of the highway connecting Allahabad with Varanasi within U.P. The basic noise data were recorded with the help of a sound level meter every hour from 10:00a.m.-05:00p.m. for all the four different sites. Four different sites, Alopi Bagh (Site1), Daraganj (Site 2), Shastri Bridge (Site 3) and Andawa (Site 4) were selected on a stretch of 10 Km for the monitoring of the noise level.

Noise descriptors such as L_{10}, $L_{90,}$ Leq and Traffic Noise Index (TNI) were assessed to reveal the extent of vehicular traffic noise on the highway. L10 gives the upper end of the level range while L90 constitutes the back surrounding level in the absence of nearby noise sources. The sound was measured in Decibel on an A weighted scale (dBA) since this scale measures sound level in approximately the

same as the human ear, Gajaa *et al*. (2003). Leq is a constant noise for a corresponding period of time that disburses the same amount of energy as the fluctuating one. L_{10}, $L_{90,}$ were used to calculate the value of Leq.

$$Leq = ½(L_{10} + L_{90}) + 0.175 (L_{10}-L_{90}) \quad (1)$$

It correlates with dissatisfaction towards traffic noise expressed by people. Measurement of TNI is difficult due to the uncertainty arising from the background noise other than traffic. Prediction is also difficult because of problem in predicting the background noise at a large distance. TNI was calculated manually by using the formula. (Patrick, 1977)

$$TNI = 4(L_{10}-L_{90}) + L_{90}-30 \quad (2)$$

Environmental Quality Standard of Noise in India

Through the promulgation of comprehensive Air Act of 1986 noise pollution has become an offence in India (Agrawal, 2002). The various limits for the urban environmental ambient noise in Leq issued in 1989 vide notification from the Ministry of Environment and Forest.

RESULTS AND DISCUSSION

The data observed from the experimental sites revealed that the noise level from all the four different sites on the highway connecting Allahabad with Varanasi which is one of the cities within U.P are exceeding the limits as per standards prescribed by the CPCB and MoEF.

The plotted graph represents the noise level of Alopi Bagh (Fig. 1) in which the L_{10} ranges from 97.2 to 100.5 dB and the L_{90} ranges from 74.5 to 81.28 dB. The Leq ranges from 91.65 to 93.28 dB and TNI 114.96 to 143.02. The maximum noise level at Alopi Bagh was 93.68 dB recorded between 10-11 am, while 92.02 dB between 11-12 am, 92.03 dB between 12-01 pm, 92.36 dB between 01-02 pm, 93.45 dB between 02-03 pm, 93.33dB between 03-04 pm and 91.65. dB between 04-05 pm. The vehicles and the pedestrian traffic are choking the roads at Alopi Bagh causing traffic breakdown. It is a highly a congested area with a heavy concentration are business and commercial activities. Further traffic regulation and hardly followed in this area. All these factors have immensely contributed to create high noise level. Similar results were also observed by (Chakraborty *et al.,* 2002).

The noise level at Daragangj (Fig. 2) showed that the L_{10} ranges from 96.6 to 99.04 dB and the L_{90} ranges from 75.3 to 79.96 dB. The Leq ranges from 89.93 to 91.73 dB and TNI ranges from116.52 to 133.48. The maximum noise level at Daraganj was 91.95 dB recorded between 01-02 pm, while 91.21 dB between 10-11 am, 89.93 dB between 11-12 pm, 90.78 dB between 12-01 pm, 90.16 at 02-03pm, 91.72 dB between 03-04 pm, and 90.81 dB between 04-05 pm. This is due to the heavy traffic flow throughout the monitoring period. Traffic Management is lacking thus increasing the flow of traffic. Similar results were also reported by (Sharma *et al.,* 2007)

Figure 3 show the variation of noise levels at Shastri Bridge where the values for L_{10} ranges from 98.24 to 98.4 dB and L_{90} from 74.24 to 83.96 dB. The values for continuous sound equivalent Leq ranges from 89.91 to 91.86 dB and TNI values ranges from 122 to 140. The maximum noise level at Shastri Bridge was 92.19 dB recorded between 02-03 pm, while 90.53 dB between 10-11 am, 91.79 dB between 11-12 pm, 91.17 dB between 12-01 pm, 89.91 dB between 01-02pm, 91.86 at 03-04pm and 90.11dB between 04-05 pm. The high variations are due to the heavy flow of vehicles passing up and down the bridge. The results also indicate that the noise level in Shastri Bridge is high due to the honking of the vehicles nearby the noise level meter.

The noise level represented in Fig 4 revealed that the noise variation at Andawa (Site 4) ranges from 97.78 to 101.74 dB for L_{10} and 77.24 to 79.72 dB. The Leq values ranges from 90.57 to 94.11dB and the TNI ranges from 123.24 to 142.12. The maximum noise level at Andawa was 94.11 dB recorded between 10-11 am, while 91.86 dB between 11-12 am, 91.45 dB between 12-01 pm, 89.97 dB between 01-02 pm, 92.12 dB between 02-03 pm, and 90.57 dB between 03-04pm and 92.18 dB between 04-05 pm. This is due to the large number of vehicles causing traffic load at these particular areas and the continuous honking of the vehicles. Similar results were also obtained by (Wani and Jaiswal, 2010).

Increase in urbanization and industrialization leads to an increase in the living standards of the people and population especially in the cities resulting in the rise of the number of vehicles which is required to help them cope up to reach their destination on time.

The noise level was recorded maximum between 10-11a.m at Alopi Bagh 93.68dB and Andawa 94.11dB while at Daraganj 91.85 dB and Shastri Bridge 91.95 dB the noise level was recorded maximum between 1-2 p.m. when compared with the other parts of the day. The selected sites were crowded and populated especially since these sites are commercial cum residential areas. The traffic load are high in these areas as this highway serve as a route leading to Sangam a well known and famous place of Allahabad which is a confluence of three sacred rivers *viz*, Yamuna, Ganga and Saraswati in which devotees from various parts of the world comes to visit and perform their rituals and sacrifices which also attract the attention of most of the tourist.

The data clearly shows that the noise pollution levels at all the four different sites have exceeded the prescribed standards laid down by CPCB and MoEF although they vary in each highway depending on the density of vehicles passing on the road and traffic (Patel *et al.,* 2013). The type of zone, geographic features, landscape and topography are the factors on which noise emission and transmission depends. Similar

Table 1: Noise level Standards laid by CPCB and MoEF (January 2010)

Area Code	Category of Area/Zone	Limits in dB (A) L_{eq} day time	Limits in dB (A) L_{eq} night time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

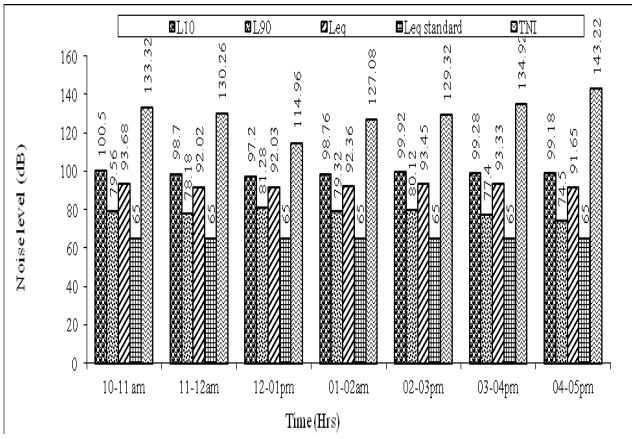

Figure 1: Variation of Noise level at Site 1 (Alopi Bagh)

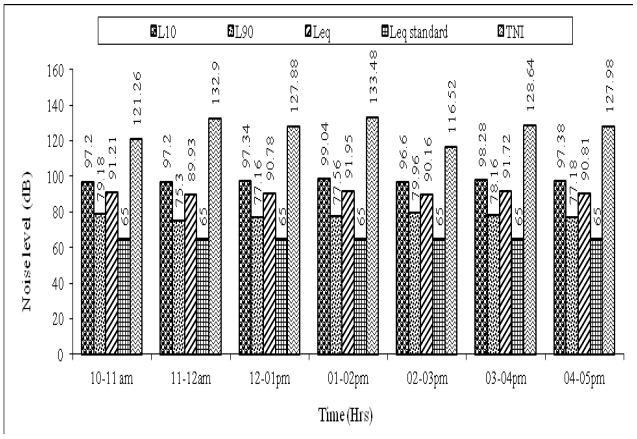

Figure 2: Variation of Noise level at Site 2 (Daraganj)

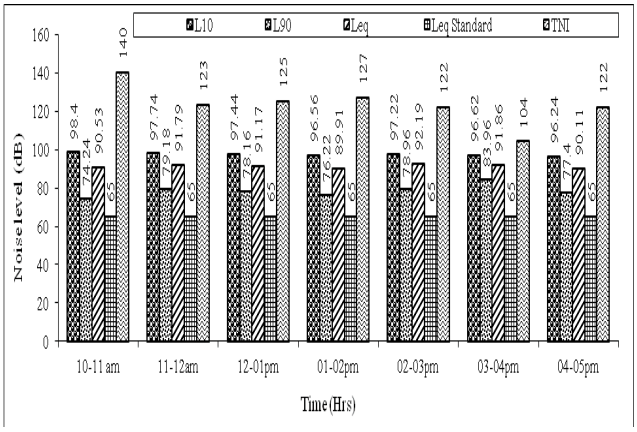

Figure 3: Variation of Noise level at Site 3 (Shastri Bridge)

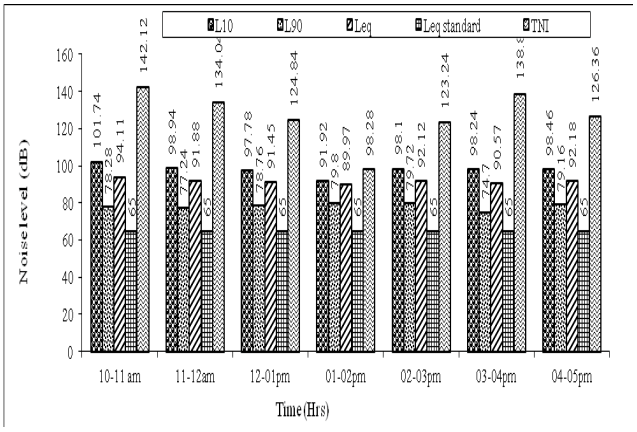

Figure 4: Variation of Noise level at Site 4 (Andawa)

findings were reported by (Goswami and Swain, 2013). Improper traffic management, narrow roads, lack of parking space which enables citizen to park their vehicles on the road side is one of the major contributions to road traffic leading to increased noise and air pollution level. Similar findings were also reported by (Chauhan *et al.,* 2010).

REFERENCES

Agarwal, S. K. 2002. Pollution management: *Noise pollution.* **5:** 136-138.

Chakraborty, D., Santra, S. C., Mukherjee, B., Roy, B. and Das, P. 2002. Road Traffic Noise in Calcutta Metropolis, India. *Indian J. Environ. Health*. **44(3):** 173-180.

Chauhan, A., Pawar, M., Kumar, D., Kumar, N. and Kumar, R. 2010. Assessment of Nose sound level status in different areas of Moradabad city. *Report and Opinion*. **2(5):** 59-61.

Gajaa, E., Gimenezb, A., Sanchoa, S. and Reiga, A. 2003. Sampling techniques for the estimation of the annual equivalent noise level under urban traffic conditions. *Applied Acoustics*. **64:** 43-53.

Goswami, S. and Swain, B. K. 2013. Soundscape of Baripada, India: An Appraisal And Evaluation From Urban Noise Perspective, *The Ecoscan*. **III:** 29-34.

Kumar, K., Katiyar, V. K., Parida, M. and Rawat, K. 2011. Mathematical Modeling of Road Traffic Noise Prediction *Int. J. Appl. Math. and Mech.* **7(4):** 21-28.

Pandey, G. and Dubey, S. 2012. Traffic noise prediction using FHWA model on National Highway- 28 in India. *J. Environmental Research and Development*. **7(1):** 107-115.

Patel, A. M. and Kousar, H. 2010. Air Quality Status in Shivamogga City, India, *The Ecoscan*. **4(1):** 29-30.

Patel, D., Shrivastava, P. K. and Patel, D. P. 2013. Study on Noise Pollution in Navsari City of South Gujarat, *J. Environmental Research and Development*. **8(2):** 291-297.

Patrick, F. C. 1977. Environmental Noise Pollution. *J. Willy and Sons*, New York.

Sharma, P. S., Gopala Raju, S. S. S. V., Murali, M. and Prasad, C. S. R. K. 2007. Assessment of noise level due to vehicular traffic at Warangal city, India, *International J. Environment and Pollution.* **30(1):** 137-153.

Subramani, T., Kavitha, M. and Sivaraj, P. 2012. Modelling of Traffic Noise Pollution *International J. Engineering Research and Applications*. **2(3):** 3175-3182.

Wani, K. A. and Jaiswal, Y. K. 2010. Assessment of Noise Pollution in Gwalior M. P. India *Advances in Bioresearch.* **1(1):** 54-59.

Yusoof, S. and Ishak, A. 2005. Evaluation of Urban Highway Environmental Noise Pollution *Sains Malaysiana*. **34(2):** 81-87.