Study of noise level in different zones of Dehradun City, Uttarakhand

Avnish Chauhan and Krishna Kumar Pande*
Department of Applied Sciences & Humanities, College of Engineering, Teerthanker Mahaveer University, Moradabad, Uttar Pradesh-244001
*Director, College of Engineering, Teerthanker Mahaveer University, Moradabad, Uttar Pradesh-244001
Corresponding Authors: avnishchauhan_phd@aol.in, pandekk@gmail.com

Abstract: The present paper deals with monitoring of Noise Pollution at different zones of Dehradun City of Uttarakhand. Exposure to high level of noise may cause severe stress on the auditory and nervous system. Transportation and horn used in vehicles are the major source of noise pollution in Dehradun City. For this purpose present study was carried out at 20 different locations with Sound Level Meter to assess the day and night sound level in Dehradun City. It is observed that all the selected locations, the level of noise was found to be above prescribed noise standard level of CPCB, India. [Report and Opinion 2010;2(7):65-68]. (ISSN: 1553-9873).

Keywords: Noise pollution, residential, silent, commercial zones

Introduction:

According to Robert Koch a Nobel Prize Winner German bacteriologist "A day will come man will have to fight merciless noise as the worst enemy of health" (Chauhan *et al.,* 2010). In developing countries like India, the expansion of urban, commercial and industrial areas have caused great disparity in the progress of its regions, particularly due to population growth. Noise is now a prominent factor in the urban environment that has deteriorated the quality of life, and traffic is in one of its main sources (Zannin *et al*. 2002). It causes significant health effects, such as cardiovascular problems, hypertension, increased levels of diabetes, changes in social behavior and induces depressive tendencies (WHO 2001). Kiernan (1997) finds that an even relatively low level of noise affects human health adversely. It may cause hypertension, disrupt sleep and/or hinder cognitive development in children. The effects of excessive noise could be so severe that either there is a permanent loss of memory or a psychiatric disorder (Bond, 1996).

Nowadays, noise pollution is considered as one of the main problems of urban communities which has many hazardous effects on the urban environment and may result in a great deal of costs on the society (Martin *et al.,* 2006; Chien and Shih, 2007).) and traffic can be considered as the main source of noise pollution in large cities (Jamarah *et al.,* 2006; Murthy *et al.,* 2007; Omidvari and Nouri,, 2009).

Noise is becoming an increasingly omnipresent, yet unnoticed form of pollution even in developed countries. Major cities of the world now facing enormous rise of noise pollution problems due to very high population rise, transport congestion and association commercial and industrial activities (Chauhan, 2008). Noise is one of the constituents of over all environmental pollution. It has been established that excessive noise is not only adversely affecting the health of human beings but is also a health hazard to all living beings. Even the non-living things are not left unaffected by high intensity of noise (Trivedi, 1999). Noise has a significant impact on the quality of life (WHO, 1980).

Material and Methods:

The ambient noise monitoring was carried out in residential, commercial, industrial and silent zones in Dehradun City of Uttarakhand, India. Dehradun is the capital of Uttarakhand, India. Dehradun is world famous for its beauty, basmati rice and litchi, is a centre of various research institutes as well. It is bounded in the north by the higher range of lesser Himalaya and in the south by the younger shivalik ranges. The river Yamuna and Ganga from the valley's western and eastern boundaries in the NW and SE direction, respectively. Geographically the valley lies between latitude 29° 55'N and 38° 30'N, longitude 77° 35'E and 78° 20'E covering an area of about 3088 sq. km, with a population of 12, 82,143 (as per 2001 census).

The ambient noise monitoring was carried out almost same type of areas viz. residential, commercial, industrial and silent zone in Dehradun city. The

measurement of sound pressure level was carried out at five different times during the day and two times in night between 06:00-24:00 hours, with the help of Sound Level Meter. Monitoring was carried out during Feb 2009 at a height of 1.5 m and 1 m away from the chest. During each sampling of noise, 20 readings of SPL were recorded at an interval of 30 seconds in a period of 10 minutes. The minimum and maximum SPL were also recorded. Ambient sounds levels for different zones in Haridwar and Dehradun city were monitored and compared with that of standard provided by schedule III of Environmental Protection Rules, 1986/CPCB/SPCB in Table 1. Sound levels are measured in decibels. Table 2 shows the noise levels at different zones of Dehradun.

Result and Discussion:

Table-1 shows the noise level standard in some important countries of the world. The sound levels recorded from different zones of Dehradun city were presented in table 2. The minimum and maximum SPL (sound pressure level) ranged between 46.2 to 96.3 dB at all the selected residential zone of Dehradun city. In case of commercial zone the minimum and maximum SPL ranged between 55.3 to 95.3 dB. On the other hand at all selected industrial zone the maximum and minimum SPL ranged between 82.6 to 94.6 dB. However in the case of all selected silent zone the maximum and minimum ranged between 39.3 to 98.9 dB. In the present study, the average noise level was higher than prescribed Indian Standard at all selected sites, except at F.R.I. University Dehradun, Uttarakhand, India.

Chauhan *et al.,* (2010) higher level of noise pollution in residential, commercial, Silent and Industrial zones of Moradabad city as compared to the prescribed limit of CPCB (Central Pollution Control Board), India. Chauhan (2008) also reported that noise level in Haridwar and Dehradun city was higher than the prescribed limit of CPCB, India. Bodhe *et al*., (2006) monitored the impact of noise on residential areas. Pathak *et al*., (2008) reported that traffic noise became main reasons of headache, high BP and other stresses among the exposed individuals in adjoining working places in Varanasi City. Ganwar *et al.*, (2006) reported that noise level in Bareilly Metropolitan city was slightly higher than prescribed limit of the Central Pollution Control Board of India. Important factors affecting noise values are continuity of the city centre traffic, dimension of the roads, position of the roads and the road surface materials with city centre crossroad signal system (Tang & Tong, 2004). Traffic noise levels increase with increasing density of traffic related with the traffic composition, road slope, road width, road surface structure distance to crossroad (Williams & McCrae, 1995).

Table1: Noise level standards of some give countries.

Country	**Industrial Area Days/Night**	**Commercial Area Days/Night**	**Residential Area Days/Night**	**Silent Area Days/Night**
Australia	65/55	55/45	45/35	45/35
India	75/70	65/55	55/45	50/40
Japan	60/50	60/50	50/40	45/35
U.S. (E.P.A.)	70/60	60/50	55/45	45/35
W.H.O.& E.C.	65	55	55/45	45/35

Table 2: Noise level (dB) during day and night time of different zones in Dehradun city.

Area	Noise level (dB) at Day	Noise level (dB) at Night	Ranges
Residential			
Basant Vihar	76.1±9.51	55.3±6.21	93.5-57.9
Subash Nagar	81.7±7.44	46.2±5.68	92.3-70.7
Karanpur	86.0±5.12	51.3±2.64	101.9-74.9
Majra	96.3±8.15	89.6±8.54	107.6-89.5
Patel Nagar	95.3±7.19	88.6±5.36	101.3-94.2
Race Course Near MLA House	73.8±5.12	62.20±5.21	92.7-55.3
Commercial			
Clock Tower	95.3±6.32	74.2±4.49	109.7-88.6
Railway Station	91.4±3.36	78.6±2.32	106.2-77.9
ISBT (Inter State Bus Terminal)	88.7±7.41	79.8±5.21	100.2-76.3
Chakrata Road	90.5±5.32	59.4±2.34	118.2-94.2
Rajpur Road	92.2±4.52	59.0±2.32	98.5 -70.2
Price Chowk	93.5±5.21	55.3±4.85	103.5-88.1
Survey Chowk	78.3±2.17	61.2±3.70	98.7-59.6
Silent			
F.R.I. Dehradun	45.9±2.32	39.3±2.14	73.2-55.6
Govt. Hospital	83.5±6.64	56.5±4.77	94.2-63.2
D.A.V. (PG) College	74.3±4.23	64.6±4.11	84.1-74.1
Gandhi Park	87.2±3.65	60.4±2.36	96.3-56.9
CMI Hospital	98.9±5.25	65.8±3.34	104.8-59.7
Industrial			
Industrial Area Selaqui	94.2±5.47	82.6±5.24	104.3-77.5
Industrial Area Patel Nagar	94.6±7.78	84.4±4.36	97.5-74.8

Conclusion:

This research paper elucidates the levels of noise pollution in different zones in Dehradun city, capital of Uttarakhand. Automobiles specially three wheelers (autorikshaw or vikram) and poor maintenance as well as music systems used in these three wheelers found to be major sources of noise pollution in Dehradun, resulting in improper communication, sleeplessness and reduced efficiency. It is clear from the presented study that all selected sites were exposed to higher noise level as compared to Indian standard noise level prescribed by CPCB (Central Pollution Control Board), New Delhi, India. To reduce noise pollution several measures can be implemented such as proper maintenance of vehicles and roads, proper checking of vehicles, poor and old vehicles should be banned and plantation of trees. Most important tackle with noise pollution, aware the people about noise pollution adverse effects.

Corresponding Author:
Dr. Avnish Chauhan

Assistant Professor
Department of Applied Sciences and Humanities
College of Engineering, Teerthanker Mahaveer
University, Moradabad, Uttar Pradesh 244001, India
E-mail: avnishchauhan_phd@aol.in

Dr. Krishna Kumar Pande
Director
College of Engineering, Teerthanker Mahaveer
University, Moradabad, Uttar Pradesh 244001, India
E-mail: pandekk@gmail.com

Reference:

Bodhe, GL, Tajne DS, Talkhande S, Dashputre R and Dharmadhikari, DM (2006). An investigation of noise exposure on residential areas: rail car depot. *J. IAEM*, 33(2), 82-87.

Chauhan, A. (2008). Study of noise pollution level in different places of Haridwar and Dehradun city (India). *Environment Conservation Journal*, 9(3): 21-25.

Chauhan, A., Pawar, M., Kumar, D., Kumar, N. and Kumar, R. (2010). Assessment of Noise Level Status in Different Areas of Moradabad City. *Report and Opinion*, 2(5):59-61.

Chien, M. K. and Shih, L. H. (2007). An empirical study of the implementation of green supply chain management practices in the electrical and electronic industry and their relation to organizational performances. *Int. J. Environ. Sci. Tech*. **4 (3),** 383-394.

Gangwar, KK., Joshi, BD and Swami, A. (2006). Noise pollution status at four selected intersections in commercial areas of Bareilly Metropolitan city. Him. J. Env. And Zoo., 20(1), 75-77.

Jamrah, A., Al-Omari, A. and Sharabi, R. (2006). Evaluation of traffic noise pollution in Amman, Jordan. *Environ. Monitor. Assess.*, **120**, 499–525.

Omidvari, M. 1 and Nouri, J. (2009). Effects of noise pollution on traffic policemen. *Int. J. Environ. Res., 3(4):645-652.*

Kiernan, Vincent (1997). Noise pollution robs kids of languages skills. *New Scientist.* May10: 5.

Martin, M.A., Tarrero, M.A., Gonzalez, A. and Machimbarrena, M. (2006). Exposure–effect relationships between road traffic noise annoyance and noise cost valuations in Valladolid, Spain. *J. Appl. Acoust*., **67 (10),** 945-958.

Murthy, K., Kamruzzaman Majumder, A.,Nath Khanal, S. and Prasad Subedi, D. (2007). Assessment of traffic Noise Pollution in Banepa, A semi urban town of Nepal. Kathmandu University. *J. Sci. Eng. Tech. **1***., 4.

Pathak V, Tripathi BD, Mishra VK (2008) Evaluation of traffic noise pollution and attitudes of exposed individuals in working place. *Atmos Environ* 42(16):3892–3898

Tang S. K. Tong, K. K. Estimating traffic noise for inclined roads with freely flowing traffic. *App. Acoust*. 2004; 65: 171-181.

Trivedi, P.R. (1999). *Encyclopedia of World Environment*. A. P. H. Publishing Corporation, New Delhi, Vol. IV & V.

WHO, 1980. Environmental health criteria on Noise. 12. World Health Organisation.

World Health Organization, WHO (2001). *Occupational and community noise*. Fact sheet 258. http://www.who.int/peh/Occupational_health/OCHweb/OSHpages/ OSHDocuments/Factsheets/noise.pdf. Accessed 22 May 2008.

Williams I. D., McCrae, I. S. (1995) Road traffic nuisance in residential and commercial areas, *Sci. Total Environ.* 1995; 169: 75-82.

Zannin, P. H. T., Calixto, A., Diniz, F. B., Ferreira, J. A., & Schuhli, R. B. (2002). Annoyance caused by urban noise to the citizens of Curitiba, Brazil. *Revista de Saude Publica, 36*(4), 521–524.

7/8/2010