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Study of noise pollution level in different places of Haridwar and Dehradun City (India)

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Abstract

Noise level was studied in four different categories of area in Haridwar and Dehradun city viz. residential, commercial, silent and industrial zones. Study was carried out at 32 locations with sound level meter to asses day and night time noise levels of Haridwar and Dehradun. However, noise level in all the areas were found to be above the ambient noise standards level. In residential areas of Haridwar and Dehradun the noise ranged between 77.40±4.52 to 89.90±8.87 dB (A) and 70.70±8.55 to 92.30±10.41 dB (A), respectively, while in commercial areas of Haridwar and Dehradun the noise ranged between 80.20±10.61 to 96.60±10.23 dB (A) and 80.90±6.63 to 89.10±9.81 dB (A), respectively.

Keywords:- *Noise pollution, Residential zone, Commercial zone, Silent zone, Industrial zone*

Introduction

The word noise is derived from Latin word, nausea. Noise may be defined as 'wrong sound in the wrong place, at the wrong time'. Unwanted sound i.e. noise happens to be one of the major pollution problem identified in the past couple of decades in urban environment. Under the Air Act (Preservation and Control of Pollution, 1981) noise has been notified as a pollutant (Deka, 2000). Major cities of the world are now facing problem of rise in noise pollution due to very high population rise, transport congestion and associated commercial and industrial activities. Noise is one of the constituents of environmental pollution. It has been established that excessive noise not only adversely affect the health of human but 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). Noise pollution affect the physical and psychological behaviour of the individuals. It may cause nausea, vomiting, pain, hypertension, high blood pressure, cardiovascular problems, sleep disturbance, restlessness, depression, fatigue, allergy, mental stress and annoyance (Rehm, 1983). Chief sources of traffic noise are motors and exhaust systems of automobiles. In addition to this, noise from the roadway is generated by commercial activity, construction, religious activities, ceremonials, festivals etc. (Kisku *et al.*, 2006). Intermittent sounds appear to be somewhat less damaging to hearing than continuous sounds because of the ear's ability to regenerate during the intervening quiet periods (Kisku *et al*., 2002; Lusk, *et al.,* 2002; Vardhan, 2003).

Haridwar is one of the most important holy cities of India, it extendes from latitude 29° 58' in the north to longitude 78° 13' in the east and has subtropical climate. It is about 60 km in length from east to west and about 80 km in width from north to south. District Haridwar lies in the foot hills of Shivalik range. Total area of district Haridwar is 2,360 km^2 with a population of 14, 44,187 (as per 2001 census). It receives millions of tourists every month, sometimes in a day. Dehradun is the capital of Uttarakhand. Dehradun is 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

range. 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).
Noise level in Haridwar and Dehradun increased noticeably during the past few years due to increase in density of population, increase in number of small and medium vehicles and workshop, increase of road and rail traffic.

Materials and Method

The ambient noise monitoring was carried out almost same type of areas viz. residential, commercial, industrial and silent zone in Haridwar and 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 Aug 2007 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 and Table-3 shows the noise levels at different zones of Haridwar and Dehradun, respectively.

Table-1: Standards of noise level in some 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

Results and Discussion

The noise level was recorded in two famous cities namely Haridwar and Dehradun of Uttarakhand state, India. Four different zone within the Haridwar and Dehradun cities were identified for the experiment. The different zones were residential, commercial, silent and industrial zone. Five areas in residential, six areas in commercial zone, three areas in silent and two areas in industrial zone of Haridwar and Dehradun were selected for the study.

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

Area Type	Place Name	Noise level (dB) day time	Noise level (dB) night time	Range
Resential	Arya Nagar	79.60±9.86	66.40±5.44	94.80-67.30
	Shivalik Nagar	86.40±8.55	69.50±5.31	103.40-78.90
	Jwalapur	88.40±9.85	65.50±6.33	109.30-79.60
	Kankhal	77.40±4.52	60.60±4.47	98.10-62.30
	BHEL Sec. 4	89.90±8.87	72.60±6.98	103.20-68.90
Commertial	Railway Station	80.20±10.61	69.70±8.41	96.30-69.80
	Bus Stand	81.30±8.11	62.30±6.45	94.20-70.80
	Bhoomanand Chowk	88.70±4.99	59.80±3.47	98.00-81.30
	Ranipur More	85.30±7.87	66.10±6.88	97.30-72.10
	Shradhanand Chowk	89.10±9.73	50.30±8.55	96.30-63.40
	Jatwara Bridge	96.60±10.23	72.70±5.87	109.6-69.70
Silent	Harikipauri	72.60±9.94	60.3±5.36	86.20-63.8
	Govt. Hospital	66.80±11.96	45.10±7.48	91.70-52.20
	G.K.V.	50.30±9.58	40.00±6.21	75.60-61.10
Industrial	SIDKUL, Hardwar	89.90±7.16	50.50±6.58	104.90-89.70
	Bahadrabad Industrial area	79.10±5.58	49.50±6.36	94.10-66.60

Table-3: Noise level (dB) during day and night time of different zones in Dehradun city

Area Type	Place Name	Noise level (dB) day time	Noise level (dB) night time	Range
Residential	Basant Vihar	70.70±8.55	45.50±4.31	87.20-59.40
	Subhash Nagar	77.00±7.44	40.40±4.68	90.40-77.40
	Karanpur	82.00±6.77	42.30±4.85	98.40-79.20
	Majra	92.30±10.41	82.60±7.55	103.40-87.30
	Patel Nagar	90.40±8.12	80.2±5.89	104.30-92.40
Commertial	Clock tower	89.10±9.81	72.40±5.33	108.80-89.80
	Railway Station	87.60±6.87	76.30±4.33	102.30-78.30
	Bus Stand	80.90±6.33	76.60±4.64	98.60-77.30
	Chakrata Road	87.60±4.74	55.20±3.93	117.10-93.80
	Rajpura Road	85.90±5.52	56.40±3.11	97.80-77.40
	Prince Chowk	88.30±6.22	52.30±4.85	99.30-80.10
Silent	F.R.I.	45.50±3.12	40.30±2.89	70.10-55.50
	Govt. Hospital	82.20±7.61	55.00±4.77	93.20-59.20
	D.A.V. (PG) College	70.10±5.33	63.40±3.20	83.10-72.10
Industrial	Selaqui Industrial Area	91.30±5.59	79.50±4.26	102.30-72.10
	Patel Nagar Industrial Area	89.40±6.89	80.30±5.66	96.60-72.70

Residential Area

During the study period the average minimum and maximum noise levels recorded during the day were 77.40±4.52 dB (A) (Kankhal) and 89.90±8.87 dB (A) (B.H.E.L. Sec. 4), respectively while during the night the average minimum and maximum noise levels were 60.60±4.47 dB (A) (Kankhal) and 72.60±6.98 dB (A), respectively. At the residential zone of Dehradun the average minimum and maximum noise levels recorded during the day time were 70.70± 8.55 dB(A) (Basant vihar) and 92.30±10.41 dB (A) (Majra), respectively, while during the night the average noise levels were 40.40±4.68 dB (A) (Subhash nagar) and 82.6±7.55 dB (A) (Majra), respectively.

Commercial Area

At Haridwar the average minimum and maximum noise levels recorded during the day period were 80.20±10.61 dB (A) (Railway station) and 96.60±10.23 dB (A) (Jatwara bridge), respectively, while during the night the average minimum and maximum noise levels were 50.30±8.55 dB (A) (Shardhanand chowk) and 72.70±5.87 dB (A) (Jatwara bridge), respectively.

At the commercial zone of Dehradun the average minimum and maximum values recorded during the day period were 80.90±6.33 dB (A) (Bus stand) and 89.10±9.81 dB (A) Clock tower, respectively, while during the night the average minimum and maximum values were 72.40±5.33 dB (A) (Price chowk) and 76.60±4.64 dB (A) (Bus stand), respectively.

Silent zone

During the day the average minimum and maximum noise levels at Haridwar were recorded 50.30±9.58 dB (A) (Gurukul Kangri University) and 72.60±9.94 (Har Ki Pauri) dB (A), respectively while during the night the average minimum and maximum noise levels were recorded 40.00±6.21 dB (A) (Gurukul Kangri University) and 60.30±5.36 dB (A) (Har Ki Pauri), respectively.

However at the Dehradun the average minimum and maximum noise levels during the day were recorded 45.50±3.12 dB (A) (F.R.I. Dehradun) and 82.20±7.61 dB (A) (Govt. Hospital), respectively while during the night the average minimum and maximum noise levels were recorded 40.30±2.89 dB (A) (F.R.I. Dehradun) and 63.40±3.23 dB (A) (D.A.V. College), respectively.

Industrial zone

At the Haridwar the average minimum and maximum noise levels were recorded 79.10±5.58 dB (A) (Industrial area Bahadarabad) and 89.90±7.16 dB (A) (SIDCUL, Haridwar), respectively, while during the night the average minimum and maximum noise levels were recorded 49.50±6.36 dB (A) and 50.50±6.58 dB (A), respectively.

At the Dehradun during the day time the average minimum and maximum noise levels were recorded 89.40±6.89 dB (A) (Industrial area Patel nagar) and 91.30±5.59 dB (A) (Selaqui, Dehradun), respectively, while during the night the average minimum and maximum noise levels were recorded 79.50±4.26 dB (A) (SIDCUL, Dehradun) and 80.30±5.66 dB (A) (Industrial area Patel nagar), respectively.

Singh and Rao (2001), reported 86 dB (A) and 64 dB (A) sound pressure level (SPL) for day and night time, respectively, for commercial area in Patna city. Pawar and Joshi (2005) reported that the noise levels at industrial, commercial, residential and silence zones were higher than prescribed limit during the day and night time. Sagar and Rao (2006) observed noise level at RCD hospital and traffic junction was more than as compared to ambient air quality noise standards (AAQNS). Kisku *et al.*, 2006, also reported that in residential areas, noise ranged between 67.7 to 78.9 and 52.9 to 56.4, in commercial cum traffic areas 74.8 to 84.2 and 68.2 to 74.9 and in industrial areas 76.9 to 77.2 and 72.2 to 73.1 dB (A) during day and night time

respectively at Lucknow city. During the study period we found that all the values of noise level at all the selected site was high than the prescribed limit of CPCB, Delhi.

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