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SHORT COMMUNICATION

MONITORING OF NOISE LEVELS IN RESIDENTIAL AREAS NEAR RAILWAY TRACKS IN VISAKHAPATNAM AND ATTENUATION OF NOISE BY BUILDING MATERIALS

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ABSTRACT

Noise pollution is one of the important pollution problems confronting the modern and fast pacing world. The impact of noise pollution by trains is considered to be of concern in the areas where railway tracks are situated in/near residential areas. With the introduction of fast moving trains the noise pollution has been substantially increased. In the present study, owing to its importance, a noise survey was carried out in the residential areas within the vicinity of railway tracks. The effectiveness in reducing the noise by building materials has also been studied.

Noise is an unwanted sound, which is one of the most pervasive problems, penetrating all areas of human activity (Raina et al. 2003). Railway noise, in general, may not seem to be a subject of widespread public annoyance, the exception being the inhabitants in the immediate vicinity of railway lines. The intensity of the problem depends, however, upon the distance from the route, train speed and number of trains. Railway system consists of three components, viz., train, track and roadbed. The rolling device (wheels and rail) is the main source of noise in this system. Other important source of noise is the body vibrations of trains.

The noise has several adverse effects on the human health. It can upset the sense of balance, reduce the efficiency of performing tasks, cause hypertension and nervous disorders, damage to auditory system, psychological stress, sleep disturbance, annoyance, fatigue etc.

Monitoring of noise levels in residential areas in vicinity of railway tracks in Visakhapatnam was made using noise meter from 6 a.m. to 6 p.m. at every five minute interval. Areas selected for the study were Marripalem, Bajji Junction and Gopalapatnam. Equivalent noise levels (Leq) were calculated. The magnitude of sound energy in the environment over a period of time is expressed in terms of quantity called Leq, which is equivalent continuous noise level. If maintained continuously, it would be equal to the total energy emitted during that period. It is expressed in dB(A), which is the average rate at which energy is received by the human ear during the period mentioned.

$$Leq = 10 \log [(1/n) \Sigma 10^{\wedge} li/10)]$$

The results of the study are given in Table 1 and the CPCB Standards in Table 2. Thus, it is observed that within the dwelling/house, the equivalent noise level in day time is 45.62 dB (A), which is within the prescribed limit. It is observed from the results that there is noise

Table 1: Results of Leq levels at various sampling places.

Area	Leq d B(A)	Approximate distance from track
Marripalem	70.08	60 m
Baaji Junction	72.85	80 m
Baaji Junction (inside the house)	45. 62	80 m
Gopapapatnam	70.29	30 m

Table 2: CPCB Standards for noise.

S. No.	Area	Leq d B(A) Day time	Leq d B(A) Night time
1.	Industrial	75	70
2.	Commercial	65	55
3.	Residential	55	45
4.	Silence zone	50	40

attenuation/reduction within the dwelling when compared to the level outside the house. Thus, the building materials are effective in noise reduction. Hence, noise attenuation studies for different building materials were carried out. The results of the study indicating the attenuation of noise by different building materials are given in Tables 3 and 4 with 0.5 m and 2 m distance between the source and the receiver. The building materials were effective in noise attenuation. Plantations can also achieve noise reduction in the transmission path.

Table 3: Results of study of transmission losses through building materials. (Distance between source and receiver, 0.5m)

Leq at source	Barrier material	Leq observed on other side of the barrier with source prevailing on the opposite side	Transmission loss
72.02	No barrier	72.02	-
72.02	wood	68.945	3.075
72.02	glass	69.842	2.178
72.02	masonry	65.662	6.358
72.02	concrete	69.489	2.631

Table 4: Results of study of transmission losses through building materials. (Distance between source and receiver, 2 m)

Leq at source	Barrier material	Leq observed on other side of the barrier with source prevailing on the opposite side	Transmission loss
81.83	No barrier	81.83	-
81.83	wood	67.876	13.954
81.83	glass	68.101	13.729
81.83	masonry	62.38	19.45
81.83	concrete	62.978	18.852

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