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TRAFFIC NOISE IN KARACHI. *Part-II.*

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In order to make a detailed assessment of the prevailing traffic noise in the Karachi city, this survey was conducted and traffic noise data was collected at 20 different sites, continuously for 12 hrs. at each site. The collected data has been analyzed for average background (L_{90}), average (L_{50}) and average peak (L_{10}) values and results are discussed with reference to some international criteria for community annoyance and existing legislation thereon in Pakistan.

Key words: Traffic noise, Noise pollution, Environmental pollution.

Introduction

Due to excessive increase in traffic in Karachi and other big cities of Pakistan, the level of traffic noise has gone much above the comfortable limits and become a major environmental problem. Earlier preliminary survey on traffic noise [1] at nine major traffic junctions in Karachi city showed that with the exception of a few occasional peaks (from ambulances, fire fighting vehicles and vehicles used by Police Officers), traffic noise level at these survey sites varied from 63 to 95 dB(A), with average values 78-85 dB(A). The results of that survey showed that in Karachi city, the levels of traffic noise were excessively high as compared to that in cities in European and other developed countries and roadside dwellers/traders were highly exposed to such a high level noise. Results of another survey [2], did not deal with average values (L_{50}); the average background and average peak values also were not expressed in terms of L_{90} and L_{10} and therefore did not give the complete picture of traffic noise in the city. The main reason of high level traffic noise in Pakistani cities is that the existing motor vehicle rules [3] and Pakistani standards [4], are not much helpful in the reduction of motor vehicle noise within the comfortable limits. The present survey was undertaken for a detailed assessment of prevailing roadside noise conditions in different areas and localities of the city and thereby to help in the formulation of noise reduction programme in the country, by providing base-line data. Detailed traffic noise data was collected at 20 different sites on busy roads in residential and commercial areas of the city from 8:00 a.m. to 8:00 p.m. at each site. The locations of measuring sites are roughly shown in Fig. 1.

Materials and Methods

Measuring instruments and techniques. The measuring instruments consisted of a Bruel and Kjaer Impulse Precision Sound Level Meter, type 2209 and a Condenser Microphone, type 4165. All the measurements were made by keeping the microphone at 1.2 meters above the ground level and at a distance of about 5 meters from the edge of the nearest line of flow of vehicles [5,6]. Noise level data was recorded in dB(A), with meter at 'slow' response.

At each survey site, noise level measurements were made at an interval of 10 mins. In each measuring mode, ten readings were taken in a period of about 2 mins and repeated after a break of about 8 mins. The collected data was analyzed for (L_{90}), (L_{50}) and (L_{10}) and the peak and the lowest values were recorded for each site.

Results and Discussion

The result of this survey is given in Table 1 in terms of average background (L_{90}), average (L_{50}) and average peak (L_{10}) values alongwith the recorded lowest and peak values for each site. Graphical plots in Fig. 2 show the curves for maximum, average and minimum noise levels at Jahangir Road from 8:00 a.m. to 8:00 p.m. Fig. 3 shows the statistical distribution and Fig. 4 shows the cumulative distribution of traffic noise for the same.

Preferred Speech Interference Levels (PSIL) have been evaluated by using the simple relationship between PSIL and dB(A); PSIL=dB(A) - 7 [7]. The average background (L_{90}) and average peak (L_{10}) values at the survey sites range from 70.1 dB(A) to 90.8 dB(A). Therefore, the evaluated PSIL values at these sites generally vary from 63.1 to 83.8 dB.

The results show that at these survey sites L_{90}, L_{50} and L_{10} values range from 70.1-78.4, 79.6-84.4 and 85.6-90.8 dB(A) and recorded lowest and peak values (except few occasional peaks) range from 61-71 and 93-97 dB(A) respectively. The peak values 100-105 dB(A) are exceptional single-event peak values recorded from ambulances. For cities with business, trade and administration, like Karachi, International Standards Organization (ISO) [8] allows 55-65 dB(A) for day time

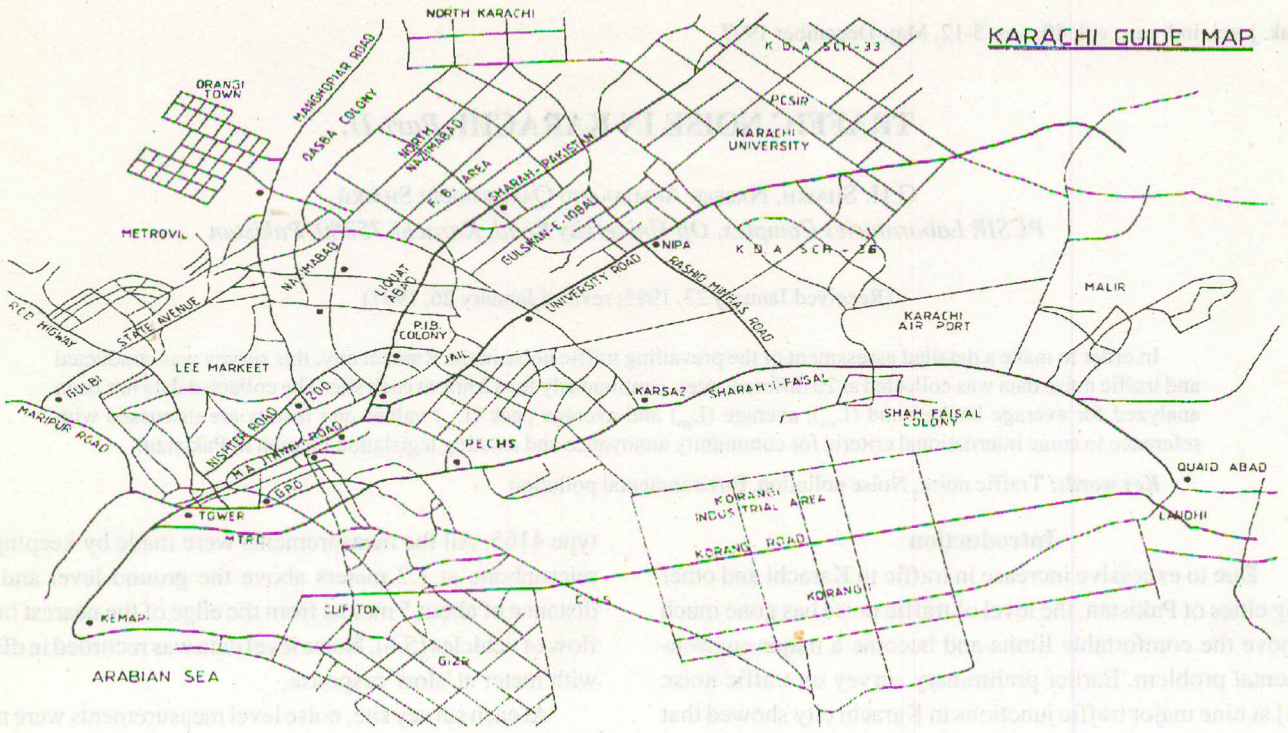

Fig. 1. Rough locations of 20 survey sites in Karachi city.

and 50-60 dB(A) for evening time. World Health Organization [9] allows 55 dB(A) L_{eq} for community annoyance in urban areas. Based on the study on the assessment of physiological and psychological effects on the individuals, Federal Highway Administration [10] established a standard (L_{10}) for exterior noise in residential areas at 70 dB(A). Exterior Noise Standard for new construction [11] categorizes the site, where noise levels exceed 80 dB(A) for one hr. in 24 hrs. or 75 dB(A) for 8 hrs. in 24 hrs. as unacceptable and discourages the construction of new dwelling units at such sites.

The results show that average background levels (L_{90}) at these sites exceed 70.1 dB(A), which are above the maximum permissible noise level recommended for community annoy-

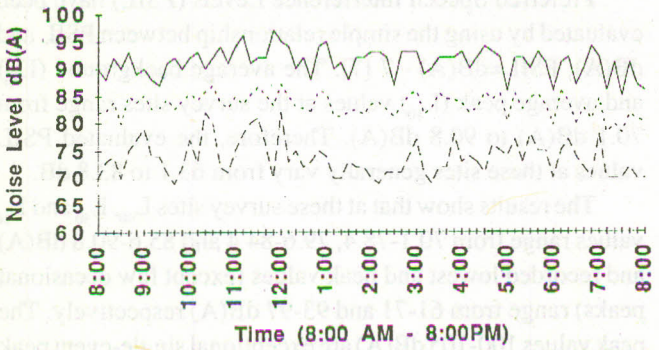

Fig. 2. Diurnal variations in road traffic noise levels as recorded at Jahangir Road from 8:00 a.m. to 8:00 p.m. Upper, middle and lower curves show the maximum, average and minimum values recorded in each measuring mode of two minutes duration between each sampling interval.

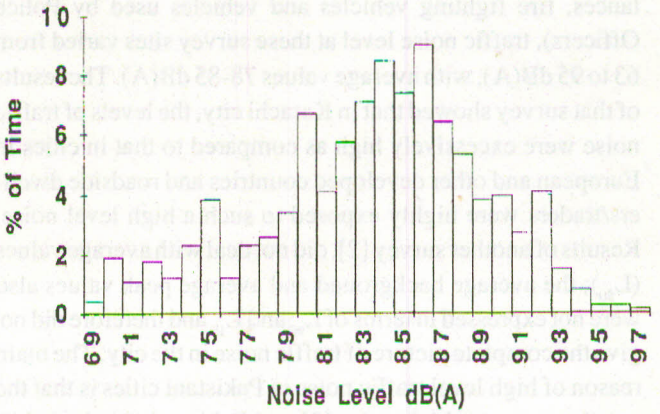

Fig. 3. Statistical distribution of road traffic noise levels recorded at Jahangir Road from 8:00 a.m. to 8:00 p.m.

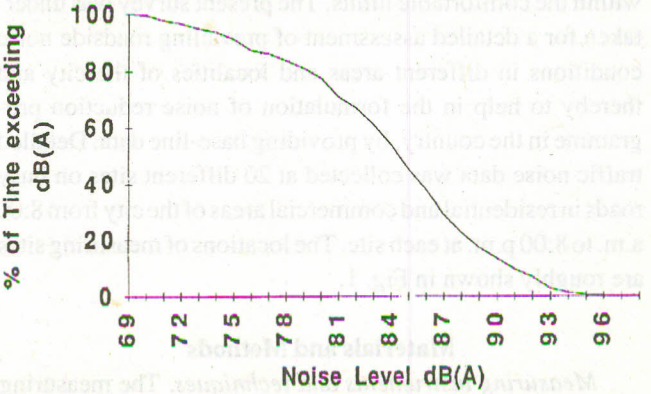

Fig. 4. Cumulative distribution of road traffic noise levels recorded at Jahangir Road from 8:00 a.m. to 8:00 p.m.

TABLE 1. TRAFFIC NOISE LEVELS AT TWENTY SURVEY SITES OF KARACHI.

S. No.	Place	L_{90} dB(A)	L_{50} dB(A)	L_{10} dB(A)	Recorded lowest values dB(A)	Recorded peak values dB(A)
1.	Aisha Manzil (Shara-e-Pakistan)	74.4	81.6	87.2	66	93
2.	Banarus Chock (Cafe Al-Watan)	73.2	81.8	88.2	65	97
3.	Business Recorder Road (Aziz Centre)	75.4	83.4	88.4	68	100
4.	Civic Centre (University Road)	73.8	81.4	87.4	67	96
5.	Empress Market (Bridge side)	78.3	84.2	90.5	71	100
6.	Modern Studio (Estate Avenue, SITE)	70.1	80.2	87.5	63	96
7.	Ghalib Library (Nazimabad Chorangi)	75.5	82.6	88.0	66	97
8.	Gurumander (Park side)	76.6	83.3	88.4	68	99
9.	Jahangir Road (Mona Square)	75.4	84.4	90.8	69	97
10.	Karimabad (Medicon side)	75.8	82.6	88.2	70	97
11.	Karsaz (Shara-e-Faisal)	72.8	81.0	87.2	65	95
12.	Korangi No. 3 (Hospital side)	70.8	79.6	86.6	61	94
13.	M.A. Jinnah Road (Bundu Khan side)	78.4	84.4	89.2	70	100
14.	Mauri Pur Road (Station side)	70.4	80.5	87.4	61	96
15.	Nazimabad No. 7 (A.O. Clinic side)	75.4	83.2	88.6	69	96
16.	Nursery (Shara-e-Faisal)	72.6	81.8	87.8	65	95
17.	Quaid-Abad (Al-Syed Centre)	71.2	80.5	85.6	63	93
18.	Rashid Minhas Road (Junaid Plaza)	73.6	81.4	87.2	67	94
19.	Sakhi Hasan (Block N side)	71.4	81.4	87.0	64	95
20.	Urdu Science College(University Road)	73.8	82.6	88.8	67	96

ance in urban residential areas [8-10]. The average (L_{50}) and average peak (L_{10}) values at these sites exceed 80.5 and 85.6 dB(A) respectively, indicating that traffic noise levels in Karachi city are alarmingly high and may have adverse effects on roadside traders and dwellers. The PSIL values for these sites, as calculated above, show that for reliable communication, the speakers at a distance of one meter from the listeners have to raise their voice to shouting levels [12], which is discourteous. But due to poor education and lack of knowledge about civic privileges and ill-effects of high level noise, no vigorous community action has surfaced against high level noise.

The results of another study [13] on the measurement of level of noise emitted by different types of vehicles in different conditions (plying on city roads of Karachi) in accordance with ISO Recommendation R-362 [14] indicate that the levels of noise emitted by these vehicles vary from 73-95 dB(A), which is very high and much beyond the maximum noise emission limit permissible by the European Economic Community [15, 16] and other national standards [17]. This study shows that auto-rickshaws are the major contributors to noise pollution, followed by trucks, buses and motorcycles. The reasons for the emission of high level noise from individual motor vehicles are: (i) lack of proper regulatory laws to limit emission of high level noise from individual vehicles, (ii) poor models of vehicles, (iii) poor maintenance of vehicles, (iv) use of defective silencers and pressure horns, (v) rash driving and (vi) to some extent uneven road surfaces. The existing motor vehicle rules [3] simply restrict the emission of high level noise from individual motor vehicles. Pakistani standard [4] in this respect allows a maximum permissible limit of 85 dB(A) for new vehicles at a distance of 7.5 meters from the source, without specification of the type of vehicle and measuring technique. Thus these are not much helpful to limit high-level traffic noise within the comfortable limits. Therefore, for controlling high level traffic noise within the comfortable limits, there is an urgent need (i) to create awareness of the ill-effects of high level noise in the society, (ii) to revise the existing motor vehicle rules [3] and Pakistani standards [4] in this respect and (iii) to frame regulatory laws, by setting maximum permissible noise emission limits for different types of vehicles (new and in use) and implement them forcefully.

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