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TRAFFIC NOISE IN KARACHI

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The road traffic is one of the major sources of noise in urban areas. Due to dramatic increase in traffic, the noise levels have gone much beyond the acceptable limits in the big cities of Pakistan and apparently there is little concern about the noise nuisance to the city dwellers. In order, therefore, to have an assessment of the noise levels as a forerunner for adopting control measures, a survey of the traffic noise levels in Karachi city has been carried out. The measurements have been made at nine major traffic junctions in some of the busiest trade centres of the city. Various analyses of the data have been carried out, and the expected community response to the increasing noise level has been discussed with reference to some international criteria.

Key words: Noise, Traffic, Survey

INTRODUCTION

In urban areas raod traffic is one of the major sources of noise. In Karachi city, with the fastly growing volume of road traffic, the noise level is generally recognised to have increased very substantially. However, no proper assessment of the noise level in this city has been carried out so far and there are little regulatory laws to reduce the noise level. In order, therefore, to assess the prevailing noise level in Karachi with a view to help provide basic data for the formulation of noise reduction programme, a survey of the traffic noise in some selected areas of the city have been carried out. In this preliminary survey the areas covered have been the major traffic junctions in some of the busiest trade centres of the city.

Instruments and techniques. The measuring instruments used in this survey have been a Bruel and Kjaer Impulse Precession Sound Level Meter, type 2209, and a calibrated condenser microphone, type 4165. The microphone was guarded by a polyurethane windscreen to avoid the effects of wind and to protect the microphone against dust and smoke. The Sound Level Meter was regularly calibrated against a standard sound source of 123.8 dB at 250 Hz using a B & K Pistaphone, type 4220.

In order to get average values, all measurements were made on slow response. A-weighted sound level measurements were made because for noise measurements A-weighting is generally preferred internationally. The instruments gave A-weighted values directly. All measrements were made at a distance of about 7.5m from the edge of the road and the microphone was kept 1.2m above ground level. Hassall and Zaveri [1] recommend a distance of 15m for motor-ways and 5m in city situations.

At each survey site, noise level measurements were taken at intervals of ten minutes. Albeit, for the very first set of measurements taken at Grumander in the morning and early afternoon hours the sampling interval was kept at 30 minutes, which was subsequently changed to 10 minutes for all later measurements. The relative flatness of the curve for Grumander during the morning and early afternoon hours can be explained as due to larger sampling time. In each measuring mode between the intervals, the noise level was worked out as the average value of ten successive readings of noise level measured in dB(A) taken over a period of two minutes. Also the maximum and minimum values amongst the ten readings in each measuring mode was also recorded. The noise level data were obtained to cover the business hours of the city, from 10.00 a.m. to 8.00 p.m. at three sites and from 10.00 a.m. to about 2.00 p.m. in the other six sites.

RESULTS

Initially sample data were collected for Grumandar, Tower, and Empress Market for almost the whole working day, starting from 10.00 in the morning to 8.00 in the evening. The graphical plot of these data is given in Fig. 1. These data show that the noise levels are comparatively higher during morning hours and late after-noons. Following this, the data for other sites were collected for morning hours, extendig somewhat upto early afternoon hours. These data are ploted in Fig. 2. This survey was carried out during the months January to May. The graphical plots in Fig. 1. and Fig. 2 show the curves for the maximum,

minimum and average noise levels recorded. For having a simplistic one-value indicator, for each curve of the maximum, minimum and average, an average of the recorded data for the corresponding curve was also worked out. These averages are given in Table 1, alongwith the peak and least-noise level values of the recorded data for each curve.

DISCUSSION

As can be seen from Table 1, the average noise levels in the survey sites range between 80-86 dB(A), the minimum and maximum ranging between 72-75 dB(A), and 88-95 dB(A) respectivley. The worst affected areas are Grumandar, Empress Market, Lasbela and Lea Market. Not only the noise levels in these areas are comparatively higher, the peak noise levels are also alarmingly high, ranging between 102-110 dB(A). Interestingly, Tower seems to be comparatively better. The traffic density in this area is by no means less than in other places; the comparatively lower noise level may possibly be explained by the rather slowly moving traffic in this area.

The ISO recommendation "Assessment of noise with respect to Community Response" [2] suggests that a basic out-door noise criterion of 35 to 45 dB(A) be applied for the case of residential areas where measurements of the

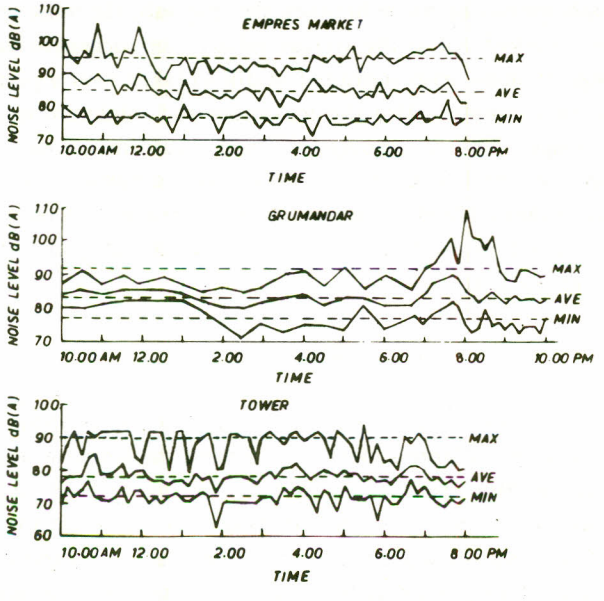

Fig. 1. Diuranl variations in noise levels as measured at Empress Market (top figure), Grumander (middle figure) and Tower (bottom figure). The maximum, average and minimum curves correspond to the maximum, avarege and minimum values recorded in each measureing mode of two minutes duration between each sampling interval.

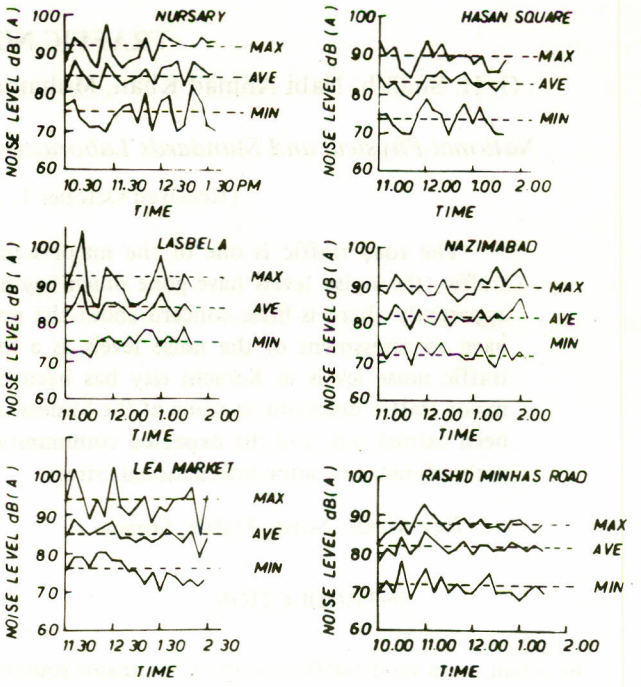

Fig. 2. Diurnal variations in noise levels as measured at Lea Market, Lasbela, Nursery, Hasan Square, Nazimabad and Rashid Minhas Road. The Maximum, average and minimum curves correspond to the maximum, average and minimum values recorded in each measuring mode of two minutes duration between each sampling interval.

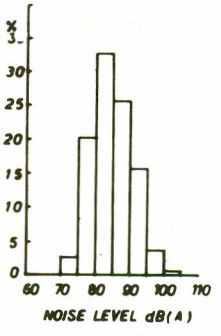

Fig. 3a. Histogram of noise levels, measured at Empress Market from 10.00 a.m. to 8.00 p.m.

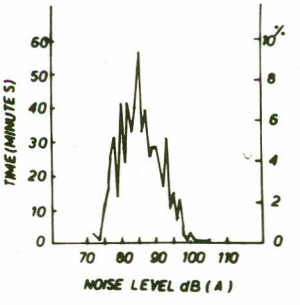

Fig. 3b. Statistical distribution of noise levels at Empress Market.

Table 1. Noise levels at the nine survey sites of Karachi

Place	Average of minimum dB(A)	Average of average dB(A)	Average of maximum dB(A)	Recorded peak value dB(A)	Recorded lowest value dB(A)
Gru mander (Park Side)	77	83	92	110	71
Tower (I.I. Chundrigar Road)	72	78	90	94	63
Empress Market (Saddar Dawakhana)	77	85	95	105	72
Lasbella Chowrangi (Mosque Side)	75	84	92	104	71
Nursery (Shahrah-e-Faisal)	75	84	92	97	70
Hasan Square (University Road)	74	83	90	94	70
Rashid Minhas Road (Shan Hospital)	72	82	88	93	68
Nazimabad Chowrangi (Sir Syed College)	72	82	90	95	69
Lea Market (Market Side)	76	85	94	102	70

Table 2. Criterian level for community annoyance.

Times of the day	Basic criterian level	Correction for		Corrected criterian value
		Type of district	Time of day	
Morning	35-45 dB(A)	+20	0	55-65 dB(A)
Evening		+20	−5	50-60 dB(A)
Night		+20	−10 to −15	40-55 dB(A)

existing background noise levels are not available. Using the correction criteria recommended [3], the criterion level for community annoyance has been worked out for outdoor noise (in the present survey the study was restricted to outdoor noise only), and is given in Table 2 for different times of the day.

Comparing against the ISO standards, it is evident that, at all the nine sites surveyed, the noise levels exceed the criterion level for community annoyance. As the lowest recorded value of 63 dB(A) is close to the upper acceptable noise level even for the busy hours of the day, it is obvious that the Karachi city dwellers, particularly living/working in these areas, are constantly exposed to unacceptable noise levels. It may also be pertinent to mention that even though most of the survey sites are business centres, there are residential flats and commercial offices as well in these areas, and the in-door criterion level for them must be much smaller.

An analysis of the statistical distribution of noise levels for the Empress Market area, having the highest average maximum, has also been undertaken. Fig. 3(a) gives the cummulative time duration for noise of a particular level, while Fig. 3(b) gives the percentages of noise-level of particular value, both calculated from the recorded data. It can be seen that the noise of levels 85 ± 5 dB(A) shares the larger proportion of noise-level spectrum, and also the noise of this level shares the larger proportion of the time-scale of the day. It, therefore, further supports the evidence that, in the areas surveyed, people are constantly exposed to considerably higher noise level for major part of the working hours.

To assess the probable intensity of community reac-

tion, reference may be made to the proposed scale (4) in this respect. As the actual average noise levels in the sites surveyed lie between 80-86 dB(A), which are higher by more than 20 dB(A), over the criterian level given in Table 2, one must expect 'vigorous community action against the existing noise situation. As our developing society is poorly educated about civic privileges, one may not see the community reaction coming on the surface. Yet, a constant exposure to noise of such high levels may indeed be affecting the community health.

REFERENCES

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