

TRAFFIC NOISE IN HYDERABAD CITY PART I. ROAD TRAFFIC NOISE

G H Shaikh* and Qameruddin Shaikh

Applied Acoustics Group, PCSIR Laboratories Complex, Karachi-75280, Pakistan

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Traffic noise survey was conducted at 20 sites in different areas and localities in Hyderabad city and at each site noise data was collected continuously from 0800 to 2000 h. The data was analyzed for L_{A99} , L_{A90} , L_{A50} , L_{A10} and L_{A1} , and approximate values of L_{Aeq12h} were evaluated for each site. The results are discussed with reference to some criteria for community annoyance and means and ways to limit high-level traffic noise are suggested.

Key words: Noise pollution, Traffic noise, Hyderabad city.

Introduction

Road traffic is one of the most widespread and annoying source of noise in the major cities of Pakistan. The result of traffic noise surveys conducted in different areas and localities in Karachi city (Shaikh *et al* 1987, 1997) show that with the exception of few occasional peaks, the levels of traffic noise in the City varies from 61 to 97 dB (A), with L_{A90} (average background), L_{A50} (average) and L_{A10} (average peak) values, in the range of 70.1- 78.4, 79.6-84.4 and 85.6 - 90.8 dB (A) respectively. These values are excessively high as compared to those of cities in European and other developed countries and much above the community annoyance limits. Roadside dwellers and traders are constantly exposed to high level non-occupational noise for more than 12 h a day.

An earlier traffic noise survey (Ahmad 1992, 1994), reports the traffic noise levels in Karachi, Lahore, Faisalabad, Hyderabad and Sukker to vary in the range of 72 - 95, 74 - 90, 70 - 92, 60 - 90 and 60-85 dB (A) respectively. But its results cannot be taken as authentic due to insufficient information provided in the report in respect of readings in dB, distance of the meter from the nearest line of flow of vehicles, time constant, fewer readings, average values based on minimum and maximum readings and incorrect range of values such as that reproduced in Table 2. A stream of road traffic is a 'line source' of noise and the value of traffic noise decreases by 3 dB (A) per doubling the distance from the source and not 6 dB (A) as reported by the Author.

In order to have a detailed assessment of prevailing road traffic noise in Hyderabad city and to guide the noise reduction programme in the country by providing base-line data, the present traffic noise survey was conducted at 20 sites on busy roads (with heavy traffic density) in different residential and commercial areas of Hyderabad city. Due to the absence of

proper regulatory laws to limit high level traffic noise in Pakistan, the results are discussed with reference to the community annoyance criteria, suggested by ISO and followed by other individual countries. Some suggestions for limiting high level traffic noise have also been given.

Materials and Methods

The measuring instrument consisted of a CEL Integrating Octave Band Sound Level Meter, type CEL-328. The meter was regularly calibrated against a B&K pistonphone 4220 (a standard sound source of 123.8 dB at 250 Hz) and checked before and after each series of measurements. During all the measurements, the meter was kept at a height of 1.5 m from the ground level and at a distance of 5m from the edge of the nearest line of flow of vehicles (ASA 1984; Hassall and Zaveri 1988) and about 1-2 m from the facade (ISO 1982; PSI 1997); however, in some cases due to existing road situations, measurements were made at kerbsides. Traffic noise data was recorded in dB (A) with time constant 'fast'. Traffic noise survey was conducted at 20 sites on busy roads with heavy traffic density and at each site, noise data was collected from 0800-2000 h after every ten minutes. In each set, ten readings were taken during a period of about two minutes and repeated after intervals of about eight minutes. In each measuring mode between the intervals, the noise level was worked out as the average value of ten successive readings recorded during two minutes. Also the maximum and minimum values in each measuring mode was recorded. The data was further analyzed for L_{A99} , L_{A90} , L_{A50} , L_{A10} and L_{A1} , and approximate values of L_{Aeq12h} were calculated for each survey site by using the following relationship (May 1971):

$$L_{Aeq} = L_{A50} + (L_{A10} - L_{A90})^2/56$$

Preferred Speech Interference Levels (PSIL) have been evalu-

*Author for correspondence

ated by using the relationship between PSIL and dB(A) (May 1971):

$$PSIL = dB(A) - 7$$

Results and Discussion

The results of the present survey are given in Table 1. Graphical plots in Figs 1-5 show the instantaneous maximum, minimum and average values of traffic noise levels. The results show that the road traffic noise levels vary from 57.1 to 101.9 dB (A), with L_{A99} , L_{A90} , L_{A50} , L_{A10} and L_{A1} values in the range of 60.4 - 73, 3, 66.2-79.6, 75.2 - 82.8, 85.0 - 90.9 and 89.1 - 99.0 dB (A) respectively and L_{Acq12h} values 81.2 - 86.9 dB (A), L_{A90} and L_{A10} values at these sites ranged from 66.2 to 90.9 dB (A) and PSIL values were found to vary in the range of 59.2 - 83.9 dB for about 80 % of the time.

For community annoyance for cities with business, trade and administration, like Hyderabad and Karachi (i) ISO 1996 (1982) suggests maximum values of 55 - 65 dB (A) L_{Acq} for day-time and 50 - 60 dB (A) L_{Acq} for evening-time, (ii) World

Health Organization (WHO 1980) allows 55 dB (A) L_{Acq} , (iii) for urban residential areas with high background noise levels, Denmark (1982) allows 50 dB (A) L_{Acq} for daytime and 45 dB (A) L_{Acq} for evening, (iv) for areas which are primarily residential, Germany allows 55 dB (A) L_{Acq} for day-time and 40 dB (A) L_{Acq} for night (Anon 1974). Surveys of road traffic noise nuisance showed that more than 50 % of the population studied were annoyed at about 68 dB (A) L_{Acq} in Paris (Aubree 1971), 60 dB (A) L_{Acq} in London (Longdom 1976) and 56 dB (A) L_{Acq} in Stockholm (Fog and Jonsson 1968). For non-occupational noise exposure, Walsh-Healy noise rules (Anon 1969) allows 75 dB (A) L_{Acq} for 8 h a day and 80 dB (A) L_{Acq} for 4 h a day. For exterior noise in residential areas, Federal Highway Administration (Virginia Department of Highways 1972 & 1973) established a standard L_{A10} at 70 dB (A) and US Department of Housing and Urban Development (1971) categorizes the site as unacceptable and discourages the construction of new building units where exterior noise level

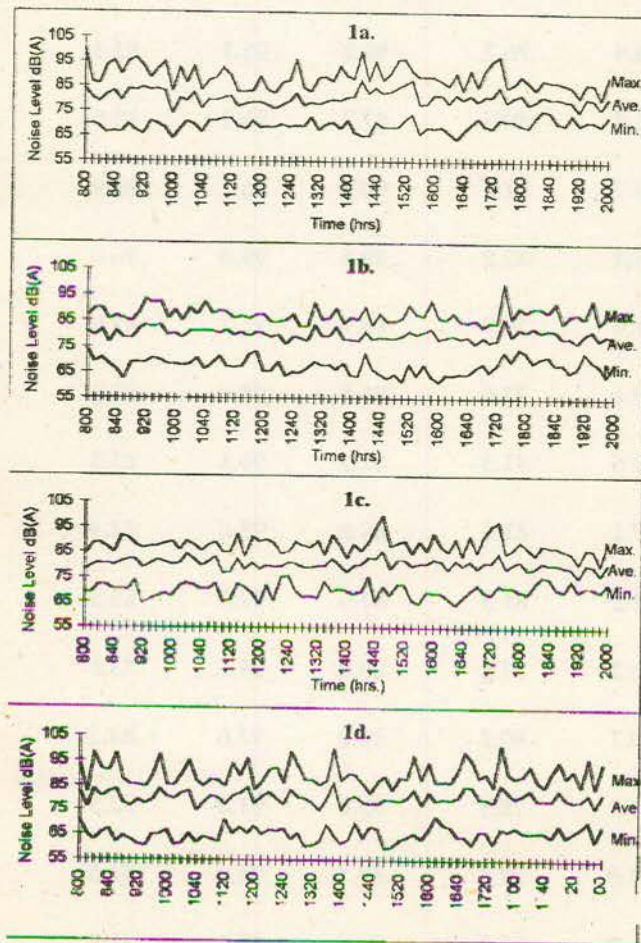


Fig 1. Diurnal variations in road traffic noise levels recorded at (a) Civil Hospital Road (b) Prince ali Road, (c) Tilak Incline road and (d) Jail Road, recorded from 0800-2000 h. Upper, middle and lower curves show the maximum, average and minimum values recorded in each measuring mode of two minutes duration between each sampling interval.

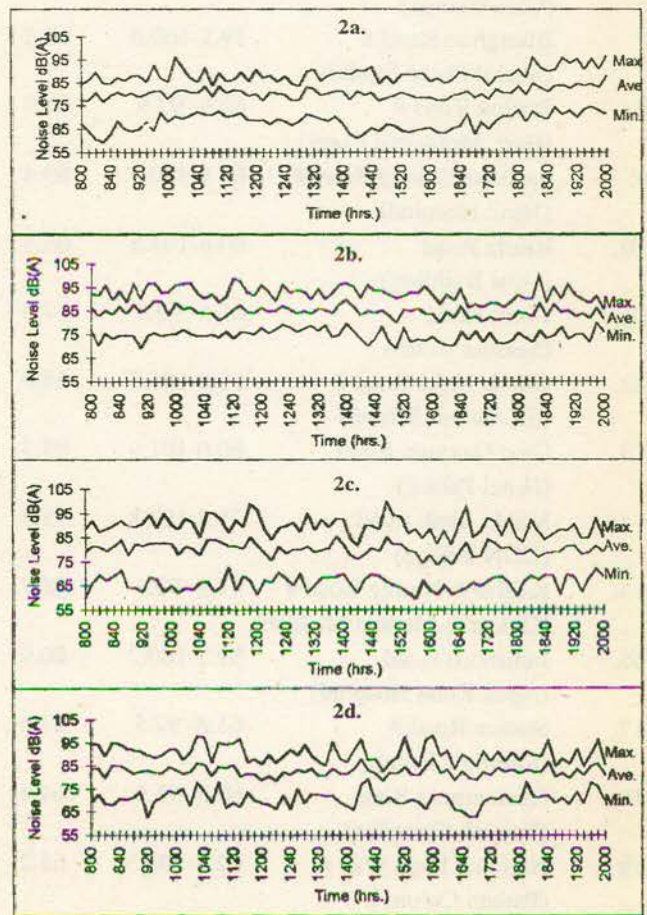


Fig 2. Diurnal variations in road traffic noise levels recorded at (a) Memon Hospital Road, (b) Risala Road, (c) Bhurghari Road and (d) Station Road from 0800-2000 h. Upper, middle and lower curves show the maximum, average and minimum values recorded in each measuring mode of two minutes duration between each sampling interval.

Table 1
Road traffic noise levels at 20 survey sites in Hyderabad city

S.No.	Place	Recorded range dB(A)	L _{A99} dB(A)	L _{A90} dB(A)	L _{A50} dB(A)	L _{A10} dB(A)	L _{A1} dB(A)	L _{Acq12h} dB(A)
1.	Civil Hospital Road (NMH School)	63.6- 99.8	66.4	69.7	77.4	87.6	96.2	83.1
2.	Prince Ali Road (Hirabad Post Office)	61.5- 99.5	64.2	69.0	78.5	85.5	92.4	83.4
3.	Tilak Line Road # (Bait-ul-Noor)	64.1- 99.8	66.3	71.3	79.2	86.8	92.6	83.5
4.	Jail Road # (Ghazi House)	59.5-101.4	61.3	68.3	76.9	86.1	94.7	82.6
5.	Memon Hospital Road (Gulshan Hotel)	60.4- 96.3	62.9	69.3	78.9	86.3	94.0	84.0
6.	Risala Road # (Cafe George)	69.0-100.5	71.0	75.1	82.0	90.5	97.1	86.2
7.	Bhurghari Road # (Shakil Photo Studio)	59.5-100.0	63.2	68.4	76.7	86.2	95.3	82.3
8.	Station Road # (Hyd, Municipal Corp.)	62.6- 97.9	66.9	71.4	80.9	87.7	96.2	85.6
9.	Sarfaz Colony Road # (Jamil Hospital)	65.4-100.5	69.4	75.7	82.8	90.9	96.7	86.9
10.	Risala Road (Goal Building)	60.6-101.5	65.5	73.4	82.2	89.5	99.0	86.6
11.	Court Road (Session Court)	63.6- 99.9	67.0	71.6	79.7	85.2	92.3	83.0
12.	Goods Naka Road # (SK Rahim School)	63.0-101.5	66.0	79.6	77.6	86.5	95.0	83.0
13.	Qazi Qayyum Road (Hotel Palace)	66.6-101.9	69.3	72.6	81.3	87.5	94.4	85.3
14.	Makki Shah Road (KGN Bridge)	71.8-100.8	73.3	77.1	81.6	88.6	98.0	84.4
15.	K Gharib Nawaz Road # (Gulzar-e-Madina Mosque)	64.2- 99.1	68.7	72.2	81.3	87.6	97.5	85.5
16.	Jamshoro Road (Agha Khan Hospital)	59.7-100.2	60.9	66.2	77.8	85.0	94.3	83.8
17.	Station Road # (Rainbow Hotel)	61.8- 97.5	67.0	70.7	80.2	86.2	92.6	84.5
18.	Cantonment Road (Tayyeb Complex)	60.3- 95.6	64.4	70.3	78.3	85.6	91.0	82.5
19.	National High Way # (Pathan Colony)	62.1-101.5	65.2	70.6	79.4	87.5	98.0	84.5
20.	Sakhi Pir Road # (Mosque side)	57.1- 99.8	60.4	66.7	75.2	85.0	89.1	81.2

measurements were made at Kerbside.

exceeds 80 dB (A) L_{Aeq} for 1 h or more per 24 h or 75 dB (A) L_{Aeq} for 8 h/24 h.

The results show that the L_{A90} values noise levels at these survey sites exceeds 66.2 dB (A), which are above the maximum permissible noise levels recommended for community annoyance in urban residential areas. The L_{A50} , L_{A10} and evaluated L_{Aeq12h} values at these sites exceed 75.2, 85.0 and 81.2 dB (A) respectively, indicating that traffic noise levels in Hyderabad city are alarmingly high and may result in adverse effects on roadside traders and dwellers, who are constantly exposed to such a high level non-occupational noise for a long duration. The PSIL values 59.2 - 83.9 dB evaluated above, show that for reliable face-to-face communication, between the speaker and listener at a distance of one meter, the speaker has to use "raised" to "shouting" voice (Webster 1968, 1969), 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 been surfaced against high level traffic noise in major cities in Pakistan.

The main reason for high level traffic noise in the major cities of Pakistan is the absence of proper regulatory laws to limit high level traffic noise. The other reasons are poor model of vehicles, emission of high level noise from individual vehicle, use of defective silencers, use of pressure and other multi-tone devices, poor maintenance of vehicles, poor condition of vehicles, rash driving, etc.

The existing Motor Vehicle Rules (1969) in Pakistan, may control emission of high level noise from individual vehicles to some extent, but due to some unknown reasons, these are not being implemented properly. The Pakistani standard (NEQS 1993) fixed a limit of 85 dB (A) at a distance of 7.5 meter from the source, with no mention of type of vehicle

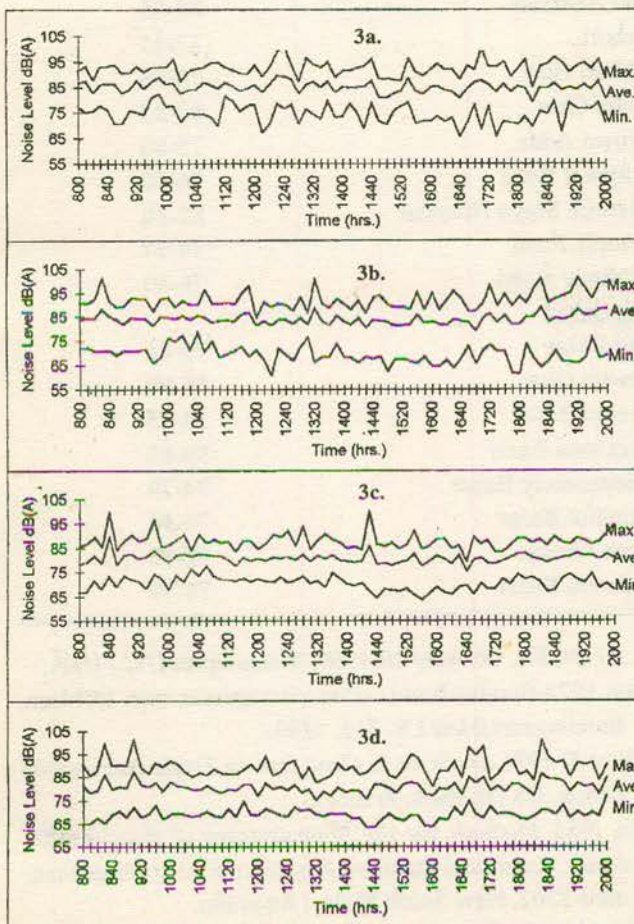


Fig 3. Diurnal variations in road traffic noise levels recorded at (a) Sarfaraz Colony Road, (b) Risala Road, (c) Court Road and (d) Goods Naka Road from 0800-2000 hr. Upper, middle and lower curves show the maximum, average and minimum values recorded in each measuring mode of two minutes duration between each sampling interval.

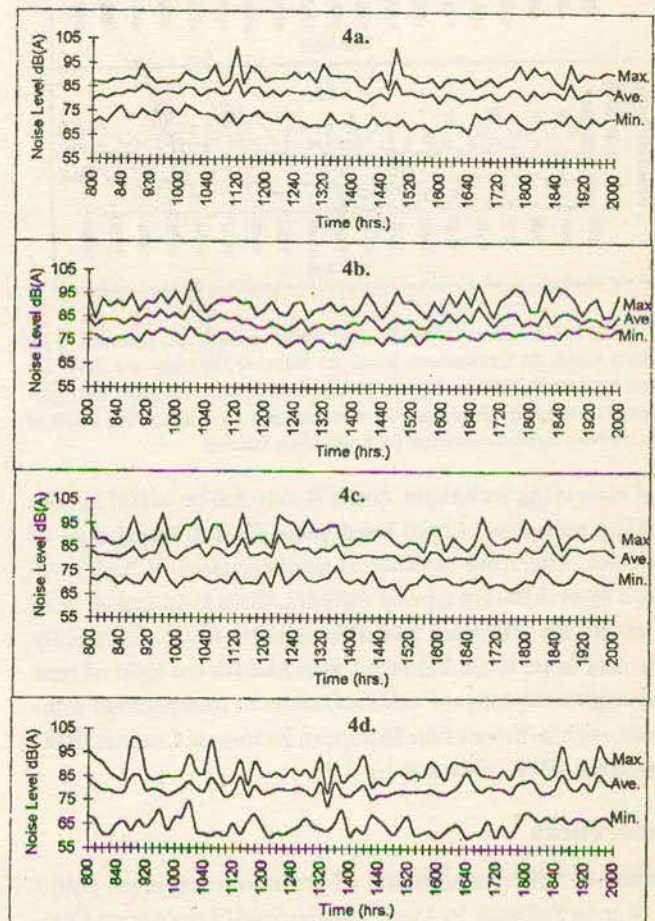


Fig 4. Diurnal variation in road traffic noise levels recorded at (a) Qazi Qayyum Road, (b) Makki Shah Road, (c) Khawaja Gharib Nawaz Road and (d) Jamshoro Road from 0800-2000 hr. Upper, middle and lower curves show the maximum, average and minimum values recorded in each measuring mode of two minutes duration between each sampling interval.

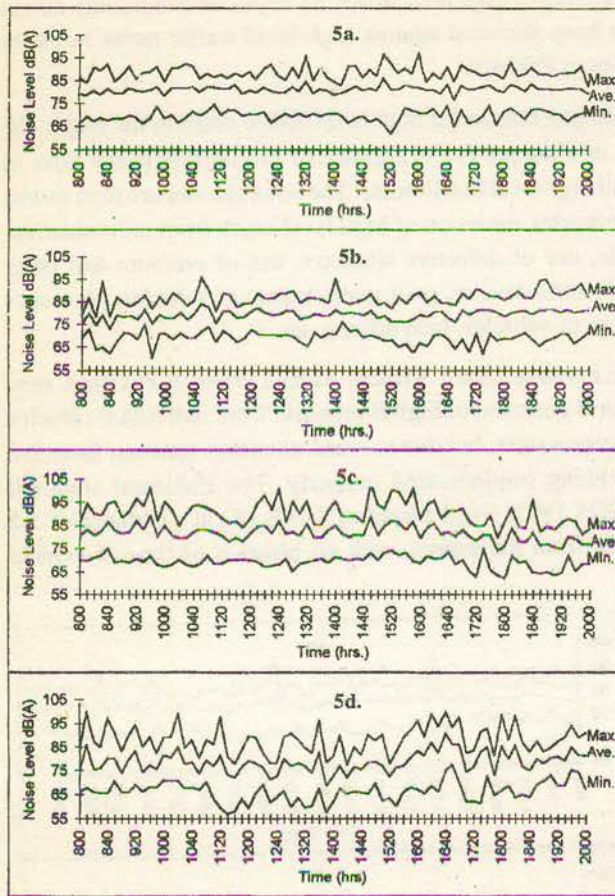


Fig 5. Diurnal variations in road traffic noise levels recorded at (a) Station Road, (b) Cantonment Road, (c) National Highway and Sakhi Pir Road from 0800-2000 hr. Upper, middle and lower curves show the maximum, average and minimum values recorded in each measuring mode of two minutes duration between each sampling interval.

and measuring technique, hence it may not be useful in controlling emission of high level noise from different type of vehicles. Therefore in order to limit emission of high level noise from different type of vehicles, there is an urgent need to revise the Pakistani Standard (NEQS 1993). Eventually one may hope to set Pakistani Standard (in the light of type and engine capacity of vehicles) close to international standards, such as those of the European Economic Council (EEC directives 1978, 1984 a & b).

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Table 2
Traffic noise levels reported for some sites in Hyderabad, Karachi, Lahore and Faisalabad (Ahmad 19 92, 94).

Place	Noise level dB (A)
<u>Hyderabad</u>	
Station Road	88-89
Chock Railway Station	88-89
Chock Goal Building	84-87
Baldia Road	80-85
<u>Karachi</u>	
Predy Street	76-80
<u>Lahore</u>	
Dharamputra	75-79
Charring Cross	79-83
Old Anarkali	82-85
Lahori	82-85
Akbari Gate	76-79
Delhi Gate	82-85
Crown Adda	75-80
Empress Road	76-80
Chowck Mayo Hospital	82-86
Temple Road	74-77
Shalimar Road	76-80
<u>Faisalabad</u>	
Rail Bazar	72-74
Ghanta Ghar	86-90
Cvered Bazar	72-75
Karkhana Bazar	80-85
Montgomery Bazar	74-79
Chinniot Bazar	79-84
Cloth Market	72-76
Bhowani Bazar	74-79

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